

DOCUMENT RESUME

ED 456 985

RC 023 185

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TITLE The Prevention of Alcohol Use by Rural Youth.
PUB DATE 1997-05-00
NOTE 115p.; In: Rural Substance Abuse: State of Knowledge and Issues. NIDA Research Monograph 168; see RC 023 179.
AVAILABLE FROM For full text:
<http://www.nida.nih.gov/PDF/Monographs/Monograph168/Download168.html>.
PUB TYPE Information Analyses (070) -- Reports - Evaluative (142)
EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS Adolescents; *Alcohol Abuse; Alcohol Education; *Drinking; Elementary Secondary Education; Etiology; *Prevention; *Program Design; Public Health; *Research Needs; Risk; Rural Environment; *Rural Youth; School Activities; Social Environment

ABSTRACT

Little is known about preventing alcohol use by youth in rural America, and almost no rural alcohol prevention program has been evaluated. To address these deficiencies, this paper critically examines the issue of alcohol use by rural youth within a public health framework. The literature is reviewed to identify what is known about the prevalence of rural teenage drinking and heavy drinking; demographic correlates of rural adolescent drinking; consequences of alcohol use by rural youth; causes of rural adolescent drinking related to family, peers, school, and personality; the ecology of alcohol use by rural youth; and macro characteristics of the rural environment that influence adolescent drinking. An overview of current prevention efforts is then provided. These include school-based programs (classroom alcohol and drug education, extracurricular activities, student intervention services, peer-managed self-monitoring, parent involvement); community-based programs (youth programs, media campaigns, community coalitions and networking, grassroots movements); and policy approaches (laws and their enforcement). Next, the match between problem and solution is assessed to reveal gaps in knowledge about rural teenage drinking and discrepancies between available knowledge and current prevention practice. The analysis focuses on problem definition, program design and implementation, and program evaluation. Extensive recommendations are offered for policy and research. (Contains 292 references.) (SV)

The Prevention of Alcohol Use by Rural Youth

Carol N. D'Onofrio

Little is known about preventing alcohol use by youth in rural America. Because most studies of teenage drinking and related prevention programs have been conducted in metropolitan areas, the word "rural" is relatively rare in the extensive alcohol prevention literature. Although descriptions of rural programs can be found, like the rural population itself, these are sparse, scattered, and heterogeneous. Almost no rural alcohol use prevention programs have been evaluated (Wargo et al. 1990).

This situation makes it difficult to determine what works in preventing alcohol use by rural youth, the extent to which rural prevention needs are being met, and whether prevention resources are optimally deployed in rural areas. Ironically, these deficiencies also confound the development of research and policy initiatives to build a more adequate knowledge base for decisionmaking about rural prevention efforts.

To address these dilemmas, this chapter critically examines the issue of alcohol use by rural youth within a public health framework. The literature is reviewed to identify what is known about the prevalence, consequences, and causes of rural adolescent drinking. An overview of current prevention efforts is then provided. Next, the match between problem and solution is assessed to reveal gaps in knowledge about rural teenage drinking and discrepancies between available knowledge and current prevention practice. Recommendations for policy and research flow from this analysis.

Given the complexity of the subject matter and methodological issues in approaching it, the purpose of this chapter is not to provide the definitive diagnosis of a neglected problem, but rather to stimulate more attention to it. As additional sources of relevant information are identified and as new knowledge is generated, policymakers, agency administrators, concerned citizens, program developers, and members of the research community will need to update this review, conduct their own analyses, and reach their own conclusions. The analytic framework that follows may assist with that task.

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SOURCES OF DATA AND THEIR LIMITATIONS

Alcohol use involves many behaviors and behavioral patterns, but data on drinking by rural youth are largely limited to cross-sectional measures of lifetime and 30-day use prevalence, as well as frequency of heavy drinking within the past 30 days. Much less information is available about age of first use, frequency of drinking, types of alcohol consumed, and settings where drinking occurs. Data on the development of drinking practices and alcohol-related problems over time are generally lacking.

Methodological weaknesses in available data further impede the development of a comprehensive national picture of alcohol use by rural youth. Sampling of rural regions and youthful age groups is not consistent. Use of single school or community sites for many studies limits generalizability. Collection of data with nonstandardized questions restricts comparisons of results from different studies. Methods of data analysis vary widely in sophistication. Some research reports do not consider the independence of samples, limitations imposed by small numbers, or the proportion of statistical tests likely to be significant by chance alone. Causality is often inferred from cross-sectional correlations.

Moreover, most studies are based on youthful self-reports of drinking. Although these measures appear to be reasonably valid (Campanelli et al. 1987; Johnston and O'Malley 1985; Malvin and Moskowitz 1983; Oetting and Beauvais 1990; Polich 1982; Single et al. 1975; Smart and Jarvis 1981), both over- and underreporting can occur (National Institute on Alcohol Abuse and Alcoholism (NIAAA) 1990; Oetting and Beauvais 1990; Werch et al. 1987). The extent to which this happens may vary with age, gender, mode of data collection, and social desirability biases in the survey situation; several investigators have observed that such biases may be more prevalent in rural than urban areas (Kelleher et al. 1992; Pandina 1986; Wargo et al. 1990; White and Labouvie 1989).

These difficulties are exacerbated by disparities and ambiguities in the definition of rural throughout the alcohol prevention literature. Many reports fail to define the term. Some rely on the definition set forth by the National Institute on Drug Abuse (NIDA) in 1980: Any community outside a standard metropolitan statistical area (SMSA) with a population less than 25,000 is rural (NIDA 1980). Other investigators use the Bureau of the Census designation of metropolitan statistical area (MSA)¹

to differentiate between urban and rural: MSAs have a population of at least 100,000 (75,000 in New England), including one or more central cities with at least 50,000 residents and adjoining areas that are socially and economically related to the central city. Areas that do not meet these criteria are considered "nonmetropolitan" (Bureau of the Census 1989).

The Census Bureau has a different definition of rural: places with fewer than 2,500 residents and open country outside urbanized areas (Census Bureau 1978). In 1989, approximately 22 percent of the U.S. population lived in nonmetropolitan areas and about 27 percent lived in rural areas as defined by the Census Bureau, but only 15 percent of the population was rural by both definitions (Braden and Beauregard 1994).

Observing that Congress has introduced legislation using the concept of rural States as well as rural areas, the General Accounting Office (GAO) now employs yet another definition: A rural State is "one of 18 States with a population density of 50 persons or fewer per square mile" (Wargo et al. 1990).

The following review operationally defines rural as source data permit. Otherwise, the term loosely means nonurban. However, because rural America is not homogenous, the criteria used to define rural and urban often determine the results of a study (Hewitt 1989). Given this and other methodological concerns, the reader is advised to proceed with caution.

National Surveys

Two ongoing national surveys report data on adolescent alcohol use. Since 1971 the National Household Survey on Drug Abuse (NHSDA) has periodically provided cross-sectional data about the prevalence of alcohol and other drug use for the U.S. household population and four age groups, including youth 12 to 17 years of age. Monitoring the Future, an annual school-based survey, has provided similar data for high school seniors since 1975 and for 8th and 10th graders since 1991. Perhaps due to underreporting in face-to-face interviews and difficulties in reaching some households, rates of youthful drug use yielded by the NHSDA are slightly lower than those found in Monitoring the Future, but overall results are quite similar (Oetting and Beauvais 1990).

Both surveys report drug use by population density or community size, operationally defined as large, small or other, and non-MSAs. The latter

designation lumps together small communities, rural nonfarm areas, and rural farm areas where both patterns of drinking and factors influencing these patterns may differ. Another limitation of national surveys is that data on drinking by population density are typically reported only by age group, and not by gender, race, region, and use of other substances. Even if such multivariate analyses were made available, local differences in youthful drinking would be impossible to distinguish within the nonmetropolitan classification. As Patton (1989) has pointed out, data from larger nonmetropolitan cities may overwhelm data from smaller, less-populated, or remote frontier communities.

National surveys also have been criticized because they tend to under-represent young people most at risk for drinking. Thus school-based surveys, including the annual survey of high school seniors, do not reach school dropouts and absentees. Surveys employing household interviews, such as the NHSDA, miss runaways and homeless youth. Until recently, the NHSDA also excluded persons living in institutionalized settings; however, beginning in 1992, sampling included people living in some group quarters, such as college dormitories and homeless shelters. Neither national survey obtains data from transient youth or those in prisons and jails.

State Surveys

Some States conduct surveys of alcohol use by youth, but little is known about the methodologies employed and findings are seldom published in the scientific literature. When data are published, urban/rural differences may not be reported (e.g., Palmer and Ringwalt 1988). Where this is not the case, methodological problems sometimes limit the value of State survey findings. In California, for example, the 1989 to 1990 Biennial Survey of Drug and Alcohol Use among California Students in Grades 7, 9, and 11 reported results for six regions, two of which included mostly rural counties (Skager et al. 1990). Students in one of these rural regions said they consumed significantly more beer, wine, and spirits than students in other regions, including the other rural region where reported alcohol use was among the lowest in the State. However, alcohol use was measured by a nonstandard variable that treated ordinal categories as an interval scale and that confounded any use in the last 6 months with frequency of use.

Regional and Local Studies

University-based researchers have conducted studies of alcohol use by rural youth in a number of small communities and rural school districts. These investigations typically have tested the relationship of selected psychosocial variables to drinking behaviors of young people. A few local studies also have tested the effects of a prevention program, usually newly developed. Such investigations, both with and without interventions, differ greatly in the variables employed, their operational definitions, sampling, methods of survey administration, analytic procedures, and overall methodological quality. Findings therefore are rarely comparable, and generalizability of results is questionable.

Data on Consequences of Alcohol Use

Few studies report data on the consequences of alcohol use by rural youth, and most of these rely on self-reports subject to perceptual and memory bias. Other indicators are seldom available for rural areas or are subject to methodological limitations (NIAAA 1990). For example, State statistics on alcohol-related motor vehicle crashes that might be used to estimate consequences of drinking for rural youth are affected by major differences among the States in the degree of testing for driver and nonoccupant blood alcohol concentrations (National Highway Traffic Safety Administration (NHTSA) 1993*b*). Studies attempting to elucidate the role of alcohol use in interpersonal violence have been flawed by reliance upon convenience samples; cross-sectional research; nonstandardized measures of drinking; inadequate hypotheses; and separate examination of sociological, psychological, and biological variables (Collins and Messerschmidt 1993; Pernanen 1993). Alcohol-related diagnoses are underreported in medical records (NIAAA 1994*b*).

Data on Alcohol Prevention Programs for Rural Youth

Few reports of programs aimed at preventing alcohol use by rural youth appear in the scientific literature. A review of rural alcohol and other drug prevention strategies cited only 21 reports published between 1978 and 1991. Ten of these papers presented data on alcohol and drug problems in rural areas and two concerned sources of drug information reaching rural students, leaving just nine that described actual rural prevention efforts (Laws 1991). Library searches yield a few more published program accounts, as well as summary descriptions of demonstration projects funded by the Office of Substance Abuse

Prevention (OSAP), Center for Substance Abuse Prevention (CSAP) (1994; OSAP 1990), or other sources (e.g., GAO 1992a).

Data collected during the 1990-91 academic year from a stratified random sample of 211 school districts that do not serve a MSA provide a good overview of school-based drug education programs in rural areas (GAO 1992b). However, this survey treated drug education generically without distinguishing efforts specifically aimed at the prevention of youthful alcohol use. Monographs, books, newsletters, teachers' manuals, and organizational guides on substance use prevention usually do not address the particular needs of rural areas, but occasionally a program for rural youth is highlighted. The ERIC database maintained by the Department of Education contains summaries of some additional rural substance use prevention programs.

As might be expected, the programmatic information available from this range of sources is uneven in content and quality. Many articles refer to substance use prevention without defining the particular substances targeted. Program objectives are often undefined. Reasons for initiating the program and its underlying rationale frequently are not explicit. Similarly, information is not consistently provided about program organizers and leaders, the number and characteristics of youth involved, the prevention methods utilized, program duration, and budget. Neither the completeness nor the representativeness of the program descriptions assembled can be readily determined. Evaluation of program effects on youthful alcohol use is notably lacking in all but a handful of reports.

ALCOHOL USE BY RURAL YOUTH

Epidemiologic studies of alcohol use prevalence, consequences of alcohol use, and related risk factors enable preventive efforts to be targeted to areas of greatest need. Unfortunately, only scant data are available on patterns of alcohol use among rural adolescents, and even less is known about the consequences of their drinking behaviors.

Use Prevalence

Alcohol is the drug most widely used by youth, rural and urban alike (Johnston et al. 1993; Kelleher et al. 1992; Napier et al. 1984; NIDA 1991; Oetting and Beauvais 1990; Wargo et al. 1990). Comparisons of alcohol use prevalence among urban and rural adolescents have yielded

mixed results. A number of general population studies completed between 1979 and 1991 found higher rates of youthful alcohol use in urban than in rural areas (Gleaton and Smith 1981; Johnston et al. 1979; Kandel 1980; Martin and Pritchard 1991; Napier et al. 1981; Zucker and Harford 1983). However, some studies have reported higher drinking rates among rural youth (Hahn 1982; Skager and Fisher 1989), while other research on youthful alcohol use has revealed few or no urban/rural differences (Elliott et al. 1989; Farrell et al. 1992; Oetting and Beauvais 1990; Swaim et al. 1986).

Reviewing many of these studies, Johnstone (1994) attributed their inconsistency to methodological issues and suggested that the observation of urban/rural differences in adolescent drinking may vary largely on the basis of the alcohol measure used for comparison. However, examination of national survey data suggests that disparities in results also may be due to cross-sectional measurement of drinking trends at different points in time.

The Monitoring the Future surveys of high school seniors show that nationally, youthful use of alcohol and most other substances peaked in 1979 and then began a gradual decline that continued through 1992. Alcohol use prevalence among rural youth mirrors this trend, but with less fluctuation than in urban areas. Thus, while current use of alcohol by high school seniors dropped in all areas between 1980 and 1992, the decline in large cities was nearly double that observed in nonmetropolitan areas. Consequently, urban/rural differences in 30-day alcohol use prevalence have narrowed considerably in recent years, and, as table 1 reveals, in 1992 the rate of current alcohol use among seniors was somewhat higher in rural than urban areas (Johnston et al. 1993).

Table 2 shows that by 1993 differences among seniors in monthly alcohol use prevalence by population density effectively disappeared. This table also shows little variation in reported drinking by eighth graders living in communities of different size. However, 30-day alcohol use prevalence was higher among 10th graders in nonmetropolitan areas than among those residing in cities and suburbs (Johnston et al. 1994).

Data from the NHSDA surveys reveal a similar pattern. Table 3 summarizes 30-day alcohol use prevalence by population density for youth 12 to 17 years of age and for young adults ages 18 to 25 from 1985 through 1993. As do the Monitoring the Future surveys, the NHSDA data show that the proportion of adolescents who drink has

TABLE 1. *Percent of high school seniors who used alcohol in past 30 days, 1980 and 1992, by population density.*

	1980	1992	% Change
Large MSAs	78	49	-29
Other MSAs	71	51	-20
Non-MSAs	69	54	-15

SOURCE: Johnston et al. 1993.

TABLE 2. *30-day alcohol use prevalence among 8th, 10th, and 12th graders by population density, 1993.*

	8th grade	10th grade	12th grade
Large MSAs	24.7	40.9	52.3
Other MSAs	27.6	38.8	49.8
Non-MSAs	25.1	47.0	51.9

SOURCE: Johnston et al. 1994.

declined over time, especially in large metropolitan areas, and that with this change, differences in youthful alcohol use by population density have diminished. The 1992 drop in current teenage drinking resulted in nearly identical use prevalence rates in urban, suburban, and rural areas.

Although the proportion of youth reporting current alcohol use increased in 1993, prevalence rates in metropolitan and nonmetropolitan areas rose in tandem. Data from both national surveys thus reveal only small differences in the proportions of rural, suburban, and urban youth who have used alcohol in the past month.

The NHSDA surveys show that regardless of community size, persons 18 to 25 years of age drink at a much higher rate than school-age adolescents. Although drinking rates in this age group also have declined over time, in 1993, older youth and young adults used alcohol

TABLE 3. *Percent of persons ages 12-17 and 18-25 reporting alcohol use in past 30 days by population density, 1985-1993.*

	1985	1988	1990	1991	1992	1993
Ages 12-17						
Large metro	33.5	25.4	23.9	21.1	15.1	17.8
Small metro	28.6	26.7	26.7	20.8	16.3	18.1
Nonmetro	29.6	23.1	22.8	18.5	15.9	18.3
Total	31.0	25.2	24.5	20.3	15.7	18.0
Ages 18-25						
Large metro	73.4	71.4	67.7	65.0	61.2	58.5
Small metro	69.0	61.4	63.0	66.2	58.8	58.4
Nonmetro	67.0	59.1	53.7	57.4	56.1	62.4
Total	70.7	65.3	63.3	63.6	59.2	59.3

SOURCES: SAMHSA 1993*b*, 1994.

in the past 30 days at more than triple the rate of teenagers in all strata of population density. Also in that year, for the first time, current alcohol use prevalence among older youth and young adults was higher in nonmetropolitan than in metropolitan areas (NIDA 1991; SAMHSA 1993*a*, 1993*b*, 1994).

The GAO reports that surveys of student alcohol and drug use conducted by several rural States are generally consistent with Monitoring the Future results. However, 1988 data from surveys in Iowa, Montana, and North Dakota indicate that in at least the latter two States, 30-day alcohol use prevalence among seniors was higher than the national average (71 percent and 79 percent, respectively, versus 64 percent). The proportion of Iowa

seniors using alcohol in the past month ranged from 50 to 70 percent (Wargo et al. 1990).

The best published data on alcohol use by youth living in areas that meet the Census Bureau definition of rural come from a 1988 convenience sample of 30 communities with populations under 2,500 and located 20 or more miles from an urban center (Oetting and Beauvais 1990). Lifetime prevalence of drinking and being drunk, the only alcohol measures reported, are shown by grade level in table 4.

Oetting and Beauvais (1990) observed considerable differences between communities in the prevalence of adolescent drinking. Swaim and colleagues (1986) also found different lifetime alcohol use prevalence rates among 12th grade students living in three rural Rocky Mountain communities. Kelleher and associates (1992) have demonstrated that the drinking practices of sixth, seventh, and eighth grade Arkansas students vary between rural regions of the same State.

TABLE 4. *Lifetime prevalence of alcohol use and getting drunk in 30 rural communities, by grade level.*

Grade level	Lifetime alcohol use prevalence	Lifetime prevalence of getting drunk
4th (N = 791)	22.8	3.3
5th (N = 1,531)	33.6	4.2
6th (N = 800)	39.5	10.2
7th (N = 11,175)	65.8	19.5
8th (N = 26,587)	77.2	32.6
9th (N = 13,693)	83.3	44.7
10th (N = 14,529)	87.4	57.3
11th (N = 10,369)	91.7	67.7
12th (N = 26,720)	93.4	75.0

SOURCE: Oetting, E.R., and Beauvais, F.

Other studies report high rates of alcohol use among rural youth in particular communities and regions. For example, a survey of eighth grade students in two rural Maryland counties revealed that 71 percent consumed beer or wine experimentally or frequently and 28 percent drank whiskey or hard liquor (Alexander and Klassen 1988). Sixth and seventh grade students in rural northern Michigan and northeastern Wisconsin have reported alcohol use rates more than triple the national average for similar age groups (Sarvela and McClendon 1987*b*). And Perry and coworkers (1993) have observed that youth in northeastern Minnesota are at very high risk for alcohol-related problems compared to the rest of the State.

Heavy Drinking

As with data on alcohol use prevalence among rural youth, findings about heavy drinking have been uneven. Globetti and colleagues (1978) reported that rural youth drink less frequently than urban adolescents, but in a more abusive manner. A 1977 survey in Indiana found that rural high school students consumed beer more often and drank both beer and wine in larger quantities than their urban counterparts. More rural than urban students also reported that they needed "7 to 8 beer drinks to get high" (Hahn 1982, p. 254). Sarvela and McClendon (1987*b*) found that middle school students in upper Michigan were much more prone to abusive drinking than the national average. In contrast, data from a national sample of adolescents measured three times between 1976 and 1983 revealed that rates of problem drinking were consistently higher in urban than rural areas (Elliott et al. 1989).

Analyses of data from community surveys led Oetting and Beauvais (1990) to suggest that problem drinking by youth may concentrate in low status or stigmatized population enclaves in core metropolitan areas or rural reservations. Based on self-reports of at least weekly drinking and an average consumption of three or more drinks on each occasion, Blum and associates (1992) classified 10 percent of Native American and Alaska Native youth living in reservation communities as potential problem drinkers.

Others have observed that abusive drinking is endemic among rural youth (e.g., Globetti et al. 1978; Napier et al. 1981; Sarvela and McClendon 1987*a*), and these reports are substantiated by data indicating that heavy drinking in this population is common. In 1992, nearly one-third of high school seniors living in nonmetropolitan areas

reported binge drinking, defined as five or more drinks in a row on a single occasion (Johnston et al. 1993). And as table 5 shows, in 1993 the Monitoring the Future survey found that the proportion of 8th, 10th and 12th graders who reported being drunk in the past 30 days was inversely related to community size (Johnston et al. 1994).

TABLE 5. *30-day prevalence of "being drunk" among 8th, 10th, and 12th graders by population density, 1993.*

	8th grade	10th grade	12 grade
Large MSAs	6.0	17.6	29.4
Other MSAs	8.4	18.2	26.9
Non-MSAs	8.1	24.7	32.0

SOURCE: Johnston et al. 1994.

Data from the NHSDA surveys reported in table 6 indicate that heavy drinking by rural youth ages 12 to 17 has declined in recent years, and in 1993 the proportion of youth who drank heavily differed little by community size. However, the rate of heavy drinking among rural residents between 18 and 25 years of age was nearly twice that of young adults in large metropolitan areas (14.3 percent versus 7.2 percent). Heavy drinking among young adults in rural areas declined somewhat in 1990 and 1991, but surveys in the 2 subsequent years indicated new increases in heavy alcohol consumption (SAMHSA 1994).

As drinking by those under age 21 became illegal in an increasing number of States, analysts of the NHSDA data compared rates of heavy drinking among respondents under age 21 and those ages 21 and older. As table 7 shows, in 1990 the rate of heavy drinking among nonmetropolitan residents under age 21 matched that of nonmetropolitan respondents age 21 and older. And in 1991, rates of heavy drinking among nonmetropolitan minors surpassed those of adults in all population strata. Comparing rates of heavy drinking among minors by community size shows that in both 1990 and 1991 youth under age 21 living in rural areas were less likely to use alcohol than their urban and suburban counterparts. However, among users, rural youth were more likely than those in large metropolitan areas to report heavy drinking.

TABLE 6. *Percent of persons ages 12 to 17 and 18 to 25 reporting heavy alcohol use in past 30 days by population density, 1985 and 1991-93.*

	1985	1991	1992	1993
Ages 12-17				
Large metro	3.5	1.2	1.5	1.1
Small metro	3.7	3.1	1.3	1.5
Nonmetro	4.0	3.1	1.1	1.6
Total	3.7	2.3	1.3	1.3
Ages 18-25				
Large metro	9.4	10.5	11.3	7.2
Small metro	9.1	12.1	9.1	12.4
Nonmetro	13.2	11.5	14.0	14.3
Total	10.1	11.3	11.3	10.4

SOURCE: SAMHSA 1994.

Rates of heavy drinking also were higher among rural than suburban youth in 1990, but the proportion of heavy drinkers was greater among suburban minors in 1991 (NIDA 1991; SAMHSA 1993a).

Age of Drinking Initiation

The Monitoring the Future surveys reveal a national trend toward younger initiation of drinking. In 1993, over one-third (36 percent) of high school seniors reported first alcohol use at grade eight or earlier (Johnston et al. 1994). This figure roughly corresponds to the 1990 NHSDA finding that among youth ages 12 to 17 years, the average age of first use of alcohol was 12.8 years (NIDA 1991). Unfortunately, neither of these surveys reports age of drinking initiation by community size.

A 1977 survey of Indiana students found that urban youth initiated beer and wine use at a younger age than rural adolescents (Hahn 1982). However, more recent studies indicate that in at least some rural areas, drinking is initiated earlier than the national average (Oetting and

Beauvais 1990; Sarvela 1990). A survey of rural students in grades 7 through 12 in a small, mid-Atlantic town and surrounding county revealed that 57 percent had their first drink by age 12 (Gibbons et al. 1986a). Other data from this study led Laws (1991) to report that one-third of rural children have had their first drink on their own by age 10.

Early drinking initiation also can be inferred from local studies reporting a high prevalence of alcohol use among rural children and young adolescents. For example, a survey of 1,190 fourth, fifth, and sixth grade students in rural New Hampshire school districts found that half drank but not regularly, whereas 5 percent were regular drinkers and an additional 2 percent were regular drinkers who had been drunk at least

TABLE 7. *Percent of persons under age 21 and ages 21 and older reporting alcohol use and heavy alcohol use¹ in the past 30 days by population density, 1990 and 1991.*

	Under age 21		Age 21 and older	
	Any use	Heavy use	Any use	Heavy use
1990 ²				
Large MSAs	34.4	3.9	60.0	5.9
Small MSAs	36.3	4.6	54.1	4.0
Non-MSAs	29.5	5.2	42.0	5.1
Total	33.8	4.4	54.0	5.1
1991 ³				
Large MSAs	32.7	4.8	58.7	5.6
Small MSAs	34.3	7.4	54.5	5.0
Non-MSAs	30.7	5.9	42.2	4.7
Total	32.6	6.0	53.5	5.2

KEY: 1 = Defined as drinking 5 or more drinks per occasion on 5 or more days in the past 30 days; 2 = N = 2,938 under age 21 and 6,276 age 21 or older; 3 = N = 10,952 under age 21 and 21,117 age 21 or older.

SOURCES: NIDA 1991; SAMHSA 1993.

once (Stevens et al. 1991). Among Native American children living on reservations, about 10 percent of those in grades four through six have been drunk (Oetting et al. 1989), and this proportion increases to 28 percent in the seventh grade (Beauvais et al. 1989). Among rural middle school students in northern Michigan, the proportion who had been intoxicated increased from 21 percent in grade six to 60 percent by grade eight (Sarvela and McClendon 1987*b*). In interpreting these findings, it is important to remember that due to low body weight, children may be prone to intoxication from even small amounts of alcohol, and that the meaning of being drunk also may differ for children and adolescents (Hansen 1993).

Type of Alcohol Consumed

Comparatively few studies have examined the relative consumption of beer, wine, and liquor by rural youth, but nationally, beer is the most popular alcoholic beverage among young people (Grossman et al. 1994). Hahn (1982) found that beer was clearly the beverage of choice for alcohol-consuming students in both urban and rural areas of Indiana, and similar results have been obtained in California (Skager and Fisher 1989). A study of seventh graders in a rural southeastern county found that girls were slightly more likely to report any use of wine than beer; however, beer was the beverage most frequently consumed by both sexes (Farrell et al. 1992). Other research in Georgia and Maryland has found that the proportion of rural youth consuming beer and wine exceeds the proportion consuming whiskey or hard liquor (Alexander and Klassen 1988; Gleaton and Smith 1981).

Demographic Correlates of Drinking by Rural Youth

Although teenage alcohol use has been found to vary by age, gender, and ethnicity, neither the NHSDA nor the Monitoring the Future surveys report analyses of these variables by community size. However, results from several local and regional studies suggest that demographic characteristics associated with youthful alcohol use nationally also may characterize young people who drink in rural areas. Thus rural alcohol use prevalence appears to increase with age and school grade level (Bloch et al. 1991; Blum et al. 1992; Gibbons et al. 1986*a*; Kelleher et al. 1992; Napier et al. 1981; Oetting and Beauvais 1990; Sarvela and McClendon 1987*a*; Stevens et al. 1991). Most studies of rural youth indicate that males are more likely than females to drink and to drink heavily (Allen and Page 1994; Blum et al. 1992; Gibbons et al. 1986*a*;

Gleaton and Smith 1981; Kelleher et al. 1992; Napier et al. 1981; Sarvela and McClendon 1988; Stevens et al. 1991), but some research has found no differences in rural alcohol use prevalence by gender (Beauvais et al. 1989; Bloch et al. 1991; Farrell et al. 1992; Sarvela and McClendon 1987a, 1987b). Kelleher and colleagues (1992) found substantial differences in the drinking rates of girls by population density and rural region in Arkansas.

Alcohol use rates appear to be higher among Native American and white youth than among those other races (Allen and Page 1994; Bachman et al. 1991; Oetting and Beauvais 1990; OSAP 1990), but this pattern may vary in certain communities. Farrell and colleagues (1992) observed no differences in drinking prevalence between African-American and white youth in a rural county of the Southeast, and similarly, Kelleher and associates (1992) found no differences by race in the drinking rates of young adolescents in Arkansas. Blum and colleagues (1992) found a higher prevalence of daily or weekly alcohol use among white teens in rural Minnesota than among a broad geographic sample of Native American and Alaska Native youth. This pattern persisted throughout the teenage years until the 12th grade, when the rate of heavy drinking among Indian youth exceeded that among white Minnesota seniors.

Rates of all types of alcohol involvement among male Native American adolescents aggregated across tribal boundaries are typically higher than those of whites and other ethnic groups (Bachman et al. 1991; Beauvais et al. 1989; Blum et al. 1992; Moncher et al. 1990; Oetting and Beauvais 1990; Johnstone 1994; U.S. Senate Select Committee 1985; Welte and Barnes 1987). Among adolescent females who drink, the prevalence of heavy drinking also tends to be highest among Native American girls (Bachman et al. 1991; Beauvais et al. 1989; Welte and Barnes 1987). Nevertheless, Native American drinking practices are extremely heterogeneous (Beauvais and LaBoueff 1985; Beauvais et al. 1989; Christian et al. 1989; May 1989; NIAAA 1994b), and exceptions to these general observations should be expected.

Few studies have compared rates of drinking among minority youth by urbanicity; however, Gfroerer and De La Rosa (1993) found in a small but nationally representative sample of Hispanic youth that those living in a nonmetropolitan area were more frequent users of alcohol, cigarettes, and illicit drugs than their urban counterparts. Noting that this finding differs from other research on the drug use behavior of minority adolescents, these investigators called for additional research on the

prevalence, patterns, causes, and consequences of drug use among the various Hispanic subgroups. Age and gender should be considered in such investigations, for youthful drinking rates by race may be influenced by interactions with these variables (Kelleher et al. 1992).

Consequences of Alcohol Use by Rural Youth

Numerous studies conclusively link teenage alcohol use to a host of health and social problems, including motor vehicle crashes and deaths, drowning, suicide, homicide, falls, fires, cigarette smoking, illicit drug use, early sexual activity, sexually transmitted diseases, rape, unwanted pregnancies, academic failure, school dropout, job difficulties, physical fights, property destruction, delinquency, and troubles with law enforcement authorities (Boyd et al. 1994; Clayton 1981; Jessor and Jessor 1977; NIDA 1987; Sixty-Sixth American Assembly 1984). In addition, the use of alcohol and other mind-altering substances has been shown to jeopardize physical, mental, and social development during the formative years and to endanger successful transition from school to the workplace (Hamburg and Takanishi 1989; Kandel 1982; Newcomb and Bentler 1988; Semlitz and Gold 1986; Steinberg 1991). Alcohol use and abuse initiated during adolescence also have numerous serious long-term consequences not only for users, but for family members, communities, and the Nation.

Systematic information on the distribution of these problems in sparsely populated areas is not available, but several studies indicate that alcohol use by rural youth is associated with negative consequences or increased risk of trouble. One exception is that Alexander and Klassen (1988) observed no relationship between school absenteeism and use of beer or wine, hard liquor, cigarettes, or marijuana by eighth graders in two rural counties on Maryland's eastern shore. However, these students were followed longitudinally, and reported drinking in the past month during grade 9 was one of several variables associated with medically attended injuries in grade 10. Adjusted odds ratios for ninth grade drinking on 3 or more days compared to 1 or 2 days in the past month indicated an incremental effect of alcohol use on injury occurrence (Alexander et al. 1992).

Similarly, Blum and colleagues (1992) found a linear increase in adverse correlates along a continuum of drinking among 13,377 Native American and Alaska Native youth living on or near rural reservations. Youth characterized as potential problem drinkers were most likely to have

sustained an alcohol- or drug-related injury, experienced school problems, had family problems associated with substance use, or ever have attempted suicide. This study also revealed that among Indian and Native youth who drink, 40 percent have driven after drinking. Over one in five of all youth surveyed said they often or sometimes ride with a driver who has been drinking or using drugs. No data were found that directly link alcohol use by Native American youth to motor vehicle traffic fatalities, but Mahoney (1991) has reported frequencies showing that most such deaths among Native Americans in New York State involve teenagers and young adults, rural areas, and alcohol consumption.

Several other studies have explored relationships between teenage drinking and driving. Kidd and Holton (1993) reported an association between alcohol use and risky driving practices of rural adolescents. Heavner and colleagues (1991) found that although high school seniors in small towns in rural West Virginia recognized that auto accidents would threaten their life and health in the immediate future, they still indulged in high-risk drinking and driving behavior. Sarvela and associates (1988a) reported more specific data on drinking and driving practices among junior and senior high school students in a small Ohio town. Approximately 19 percent of these students had driven under the influence of alcohol, 35 percent had ridden in a car with an intoxicated school-age driver, 35 percent had refused a ride from a friend who was intoxicated, and 43 percent had tried to stop a drunk friend from driving. No gender differences were found regarding drinking and driving, but males drank in greater quantity than females. Both drunk driving and riding with a drunk driver increased substantially between grades eight and nine.

Comparable results were obtained from similar research in rural Illinois; however, in this latter study females were somewhat more likely than males to report riding in a car with a drinking driver, while males were somewhat more likely to report driving under the influence. Frequency of drinking within the past 6 months strongly predicted both dependent variables. Grade point average was unrelated to these behaviors, thus challenging the assumption underlying lower auto insurance rates for youthful drivers who are good students (Sarvela et al. 1990).

Thombs and colleagues (1994) also have reported that about 20 percent of high school students age 16 and older in rural New York drove while intoxicated at least once during the past 12 months, and 34 percent of students in grades 7 through 12 rode with an intoxicated driver during

this time period. Although differences in methods of reporting data preclude precise comparisons, the consistency of these rates with those from Ohio and Illinois is striking.

Examining immediate consequences of alcohol use among rural middle school students in upstate Michigan, Sarvela and McClendon (1987b) found that 23 percent had been sick from drinking and 20 percent felt guilty after alcohol use. Expressions of guilt after drinking increased with age and were significantly higher among females than males. Holcomb and associates (1990) also have reported that between 4 and 14 percent of junior and senior high school students in rural central and southern Illinois had experienced negative consequences of their alcohol or other drug use. Harmed friendships, fighting, trouble with family, and self-dissatisfaction were most frequently reported. Males and females reported negative consequences due to substance use at similar rates for six of the nine problems considered, but males were more likely than females to report fighting, trouble with the law, and trouble with school authorities. Unfortunately, this report does not differentiate types of consequences experienced by type of substance used.

ETIOLOGY OF DRINKING BY RURAL YOUTH

Epidemiologic data on patterns and consequences of alcohol use by rural youth provide the scientific rationale for targeting prevention programs to young people at greatest risk, but designing effective interventions also depends on understanding the etiology of youthful drinking behavior. Modifiable links in the causal chain of events leading to youthful alcohol use and negative consequences of drinking can then be identified and targeted for change.

The limited information available about differences in youthful alcohol use by population density has not been a central consideration either in searching for predictors of drinking behavior or in developing etiologic models of youthful alcohol use. An important issue, therefore, is whether predictors identified to date, etiologic models based upon them, and related prevention programs are generalizable to youth in rural areas.

Key Predictors of Alcohol Use by Rural Youth

Many potential predictors of teenage alcohol use have been studied, but with mixed results. In a succinct review, Dryfoos (1990) identified five sets of variables that most researchers agree are risk markers for later substance abuse:

... early initiation [of any substance use] and susceptibility to peer influence are significant markers. Family influences are also important: lack of parental support, involvement, and caring and parental approval of drug and alcohol use are strong markers of risk. Certain personality patterns are significant: nonconformity, rebelliousness and independence (from parental authority, but not necessarily from peer influences). School problems emerge early, including misconduct, truancy, and low achievement, which gets translated in later years into being "turned off" by school and having low aspirations for further education (p. 57).

Although little research has examined whether these antecedents predict alcohol use by rural as well as urban youth, results from available studies are generally consistent with this summary.

Age of First Alcohol Use. Donnermeyer (1993) found that age of first alcohol use predicted current alcohol use among 197 rural and small-town 7th and 11th graders from north central Illinois. Age of first alcohol use also was related to first use of marijuana, which in turn was related to first use of hard drugs. These cross-sectional results are complemented by Winfree's (1985) longitudinal finding that alcohol use in grade seven predicted alcohol use 3 years later by youth in a rural Rocky Mountain town.

Peer Influence. A number of studies have found strong correlations between alcohol use by rural youth and peer drinking (Beauvais et al. 1989; Kelleher et al. 1992; Lassey and Carlson 1980; Napier et al. 1984; Oetting and Beauvais 1987; Oetting et al. 1988, 1989; Sarvela and McClendon 1983, 1988), even in elementary school (Stevens et al. 1991). On the other hand, in a survey of over 1,200 rural high school students in western New York State, Thombs and associates (1994) found that peer acceptance was associated with only one alcohol-related variable: whether or not teenagers ride with drunk drivers.

Oetting and colleagues (1989) observed stronger correlations between peer associations and alcohol use among rural Anglo youth (0.58) than among Native American students (0.28). These investigators speculated that Anglo youth may use alcohol mostly with peers, but due to limited availability of alcohol on reservations and transportation difficulties, Indian youth may drink fairly often in situations where they are not with peers who have the same level of alcohol involvement.

Gleaton and Smith (1981) demonstrated that perceived drinking by best friends exceeds actual use rates among high school students in both urban and rural settings. Lassey and Carlson (1980) found that talking about problems with best friends was associated with adolescent drinking in rural Idaho. However, in a longitudinal study of youth from a town in the Rocky Mountain region, Winfree (1985) discovered changes over time in the extent to which an adolescent's views about drugs conflict or mesh with those of peers and the frequency of peer-based discussions about drugs, either pro or con, changes over time. Regardless of the nature of these changes, they were unrelated to alcohol use as youth grew older.

Napier and colleagues (1984) surveyed high school students in rural Georgia to test the proposition that the types of individuals with whom youth associated and the role models they chose for emulation would be related to their drug use behavior. Recognizing that the behavior of adolescents can be affected by real or imagined role models, these investigators found that those youths who identified with nonconformist groups (those who listened to rock music, were interested in 4-wheel-drive vehicles, and potheads) were more likely to use illegal drugs, including alcohol, than were students who identified with socially conforming school, religious, and soul music groups. Dating frequency, use of drugs by friends, and the wish to be accepted by friends also were positively correlated with the use of drugs, as were drug use at home, at social events, in cars, and in friends' homes. On the other hand, drug use was negatively associated with church attendance and number of school activities.

Parental Influence. Several aspects of possible parental influence on alcohol use by rural youth have been investigated. Fournet and colleagues (1990) found that from 9 to 27 percent of students in grades 5 through 12 in four rural school districts viewed their parents as approving of their drinking. Students in all grades also were aware of friends who had problems because of parental drinking. Perceived

family attitudes toward drinking were strongly related to the use of alcohol by elementary school children studied in rural New Hampshire (Stevens et al. 1991) and by seventh graders in rural North Carolina (Dignan et al. 1986).

Parental drinking also has been highly associated with alcohol use by rural youth (Chambers et al. 1982). Kelleher and associates (1992) discovered that both parental drinking and parental approval of adolescent drinking were associated with alcohol use by sixth, seventh, and eighth grade Arkansas students, but the strength of correlations varied in two rural areas, as well as in urban and suburban cities. Youth from the Arkansas delta reported more family-influenced alcohol consumption than those from the Ozark highlands, who revealed a peer-influenced pattern of drinking. These effects were particularly marked among girls.

Lasseby and Carlson (1980) found that drinking behavior of fathers and, to a lesser extent, of mothers was strongly associated with the drinking patterns of 8th and 12th graders in rural Idaho. Another survey of 3,179 ninth grade students in a rural midwestern State revealed that adolescents who reported alcohol or drug use by family members were more likely than other youngsters to report personal use of alcohol, cigarettes, marijuana, or speed. Additionally, these youngsters were more likely to report sexual abuse and to say that they used substances because of family problems, and because they were sad, lonely, or angry (Hernandez 1992). However, a survey of high school students in a rural midwestern community found alcohol use was common among all adolescents, while a history of physical and sexual abuse was associated with other problem behaviors (Hibbard et al. 1990).

Blum and associates (1992) demonstrated powerful effects of parental drinking and driving practices on related behaviors of Native American and Alaskan Native youth living on reservations. Among teenagers of driving age, nearly half of those who had seen their parents consume three or more drinks before driving reported having done the same. However, among the 73 percent of youth who had not seen their parents drink and drive, almost 70 percent said they would never mix alcohol and driving.

Surveying a cohort of students from a rural Rocky Mountain community in middle school and then 3 years later, Winfree (1985) found that the majority did not discuss drugs with their parents at either time point.

Nonetheless, the proportion of youth having such discussions increased with time, and the tenor of these discussions was typically negative.

Donnermeyer (1993) found intact family structure unrelated to alcohol use by 11th graders studied in rural Illinois. However, in a survey of junior and senior high school students in rural Ohio, youth from broken homes reported a higher incidence of parental drinking problems than did students living with both parents, and these perceptions appeared related to youthful drinking behavior (Newcomb and Sarvela 1988). Another study of 9th and 12th grade students in rural Ohio found that stability of home life as measured by parents' marital status and quality of relationship was correlated with frequency of both alcohol and marijuana use (Napier et al. 1981). Whether or not seventh grade students were living with both natural parents and perceived quality of the parent-child relationship also predicted alcohol use in grade nine in a rural eastern community (Bloch et al. 1991). Similarly, Lassey and Carlson (1980) found that closeness of relationship with father and mother and a high level of problem-related communication with parents were associated with a lower probability of teenage drinking in rural Idaho.

These findings are generally consistent with the proposition that parental alcohol consumption and family management practices are more important determinants of youthful alcohol use than family structure (Dryfoos 1990; Peterson et al. 1994). However, some results from rural research remain difficult to explain. For example, Gibbons and colleagues (1986a) found that mother's occupation was related to frequency and amount of drinking by adolescents in a rural county of a mid-Atlantic State. These investigators speculated that youth whose mothers work in higher level occupations might have more money to spend on alcohol, or that sons and daughters of working mothers might have less supervision than children of full-time homemakers.

Personality Traits. Few studies have investigated relationships between personality traits of rural youth and their drinking behavior, but Oetting and associates (1989) have reported that only a small amount of their alcohol involvement can be attributed to psychopathology. Workman and Beer (1992a, 1992b) found an association between aggression and alcohol use among students from a small high school in rural Kansas. Another study in this locale found sensation-seeking unrelated to alcohol use among high school honor students (Baker et al. 1991). Sensation seeking contributed only marginally in discriminating intensity of drinking by rural adolescents in New York State, but this

variable was moderately important in distinguishing rural youth who drove under the influence and rode with intoxicated drivers (Thombs et al. 1994).

In a path analysis of data from rural youth, Swaim and colleagues (1989) found that five emotional distress characteristics (anxiety, depression, self-esteem, blame/alienation, and anger) were linked to number of friends using drugs and number of drug offers from friends, but only anger was directly related to drug use. In another study, this group of investigators compared emotional distress and alcohol use among rural Indian and Anglo high school juniors and seniors. Anger and anxiety were modestly correlated with alcohol use by Anglos, and peer associations mediated this relationship. Among Indian teenagers, anger, depression, blame/alienation, and anxiety were negatively correlated with alcohol use. After the mediating effects of alcohol-using peers were controlled, Indian students with higher anger used *less* alcohol (Swaim et al. 1989).

School Problems. A longitudinal study of 625 children from six schools in small Montana towns found that negative school attitudes and negative self-concept in grades three and four predicted alcohol use in grades six and seven (Long and Boik 1993). Another longitudinal study of youth in a single rural school district in the eastern United States found marks in school and academic activities in grade seven predicted whether in grade nine students never got drunk, got drunk once a year or less, or got drunk monthly or more often (Bloch et al. 1991). Among Native American adolescents from rural reservations, those who reported below-average school performance were more than twice as likely as those doing above average in school work to drink alcohol weekly (Blum et al. 1992). However, a study of 10th and 12th grade students in rural Pennsylvania had surprising results: Students who were heavy users of alcohol scored higher on career decisionmaking readiness than students who used alcohol less frequently (Pendorf 1991).

Etiological Models of Alcohol Use. Within the relatively small cadre of investigators studying alcohol use by rural youth, some have examined multivariate relationships and a few have done so within a theoretical framework of youthful drinking etiology. Napier and colleagues (1984), for example, were guided by differential association and differential identification models of deviancy. These concepts were integrated into the larger theory of social control and deviance that informed Winfree's (1985) investigation. Both perspectives incorporate

attention to theories of adolescent development, particularly as they affect changes in peer and parent relationships.

Focusing explicitly on developmental theories of teenage drug use, Donnermeyer and Huang (1991) demonstrated that the time rural youth spend with friends and with family interact with age to influence consumption of alcohol and other substances. These authors suggested as a hypothesis for further research that the interaction of age and family influence on youthful drinking would be stronger in a rural or farming community than in a lower-class urban neighborhood.

Oetting and Beauvais (1987) developed peer cluster theory to explain how various factors interact to influence drug use behavior. This theory proposes that tightly knit and cohesive subsets of the peer group provide the specific link between five domains of variables that either set the stage for substance use or protect youth against it. Although analyses of cross-sectional data collected from rural youth have supported this theory (Beauvais et al. 1989; Oetting and Beauvais 1987; Oetting et al. 1988, 1989; Swaim et al. 1989). Hayes and Revetto (1990) reanalyzed some of these data to point out that alternative models should be considered. In one such model, both family sanctions and school adjustment were directly related to adolescent drug use. In another, drug use was an intermediate variable that, with family sanctions and religious identification, predicted school adjustment. As Dryfoos (1990) has observed, untangling cause-effect relationships in predicting behavior is in itself a high-risk activity.

Two etiologic models in particular have been applied in the development of alcohol and drug prevention programs. The social influences or social normative model is behavior specific and holds that youthful alcohol use is affected by parental modeling, peer pressure and drinking practices, and the media. As the preceding review reveals, these relationships are very complex and not well understood. Nonetheless, prevention programs based on this model attempt to make youth aware of social influences on their substance use behavior, to correct perceptions about the prevalence of peer drinking, and to develop skills for resisting peer pressure or coping with a broader array of life problems (Bangert-Drowns 1988; Botvin et al. 1984; Botvin and Wills 1985; Dielman 1994; Hansen 1992).

The other dominant prevention model holds that common risk factors underlie youthful alcohol use and other problem behaviors. Problem behaviors are thought to increase with the number of risk factors youth

experience (Bry et al. 1982; Hawkins et al. 1986; Jessor and Jessor 1977; Newcomb et al. 1986). Interventions that reduce these risk factors or enhance protective factors therefore are presumed to prevent not only alcohol use but also other behaviors that jeopardize health and well-being.

In a survey of rural, suburban, and urban school districts conducted by the National Rural and Small Schools Consortium and the American Council on Rural Special Education, school administrators were asked to estimate the prevalence of numerous risk factors among students at all grade levels. Respondents estimated that 17 percent of rural students compared to 10 percent of urban ones were substance users. Overall, rural children fared worse than nonrural in 34 of 39 statistical comparisons. These results support the view that rural youth are characterized by many dimensions of risk (Helge 1990), but the relationship of these risks to alcohol use has not yet been established.

Several studies have demonstrated that teenage drinking is related to other forms of substance use in rural areas (Donnermeyer 1993; Farrell et al. 1992; Moncher et al. 1990; Stevens et al. 1991). Some research also has shown that common risk factors predict alcohol and other drug use by rural youth. Silverman (1991) readily distinguished high-risk and low-risk youth in a survey of 1,175 students in 7th to 12th grades in a rural school system. Most students (83 percent) were either abstainers or experimental users of substances, including alcohol. However, 17 percent were multiproblem teens with a clearly identified lifestyle:

They were non-conformists who preferred heavy metal rock, indulged in multiple substance use, frequent sexual activity, and received poor grades. Quality of parental involvement was both a correlate of and a solution to drug abuse (p. 107).

Farrell and colleagues (1992) found that all but 1 of 15 risk factors identified in an earlier study of urban youth were related to at least one category of drug use among rural seventh graders in a southeastern State. An index based on a subset of 10 risk factors was significantly associated with the prevalence and frequency of cigarette, beer and wine, hard liquor, marijuana, and other drug consumption, but only 6 percent of the students had 7 or more risk factors. Another study in a rural school district in the eastern United States found that six risk factors measured in the seventh grade predicted the frequency of getting drunk 2 years later. This risk factor index also predicted frequency of alcohol use in an eighth grade replication sample. No age or gender differences in these

predictors were observed (Bloch et al. 1991). Moncher and colleagues (1990) found that a 16-item risk factor index was highly correlated with lifetime use of alcohol and other substances by fourth and fifth grade Native American youth from reservation sites and tribal communities throughout the Pacific Northwest.

These data suggest that the risk factor model has potential for predicting alcohol and other drug use by rural youth, but it holds less promise for understanding the etiology of youthful drinking behavior and therefore for guiding prevention programs. Each of the cited studies assessed different risk factors with little overlap, except that items were generally related to the families of variables already identified as major predictors of youthful substance use. Each index also was based on a different number of items. Index construction assumed each risk factor had equal weight and that the relationship between variables was additive. Consequently, results provide little new insight into factors affecting alcohol use by rural youth with one notable exception.

Some risk factors initially included in two of the indices described above were removed because they were not correlated with drug use by rural adolescents. Farrell and associates (1992) eliminated "high emotional distress" from an index previously used with urban adolescents, but "low emotional restraint" was retained. Bloch and colleagues (1991) removed "self esteem" and "emotional tone" from their risk factor index. Both sets of authors commented that the variables omitted may reflect urban/rural differences in risk factors for substance use. For instance, Bloch and colleagues suggested that alcohol use may not be viewed as deviant among rural adolescents, or alternatively, that self-image does not predict alcohol consumption in this population.

Findings from risk factor research with rural youth have not led to agreement on implications for prevention. Bloch and colleagues (1991) concluded that prevention programs need to be broad based and multifaceted in order to deal with the diversity of risk factors. Observing that different factors interact with different ages to predict teenage use of alcohol, marijuana, and hard drugs, Donnermeyer and Huang (1991) recommended customizing prevention programs for each type of substance to specific age groups. Farrell and colleagues (1992) suggested that their risk factor index might be used at the individual level to identify high-risk youth for more intensive interventions or to identify schools that contain higher percentages of high-risk youth. At the same time, these authors cautioned that not all youth with a high risk factor

index are involved in substance use, that some risk factors may be consequences rather than causes of use, and that the results of their study may not be generalizable to other rural areas.

Moncher and associates (1990) have expressed ethical concerns about the effects of using assessment tools that label some youth high risk, noting that this is especially important among Native American youth, many of whom must deal with issues of cultural scapegoating at an early age. Studies reporting the distribution of scores on risk factor indices have found only small percentages of adolescents with high scores, and as Silverman's (1991) study suggests, these youth already may be set apart in a distinct adolescent subgroup. Other issues concern the sensitivity of risk-factor indices and implications of false positive and false negative identifications of youth at risk.

Both of the dominant etiological models of youthful substance use have been criticized for emphasizing the importance of individual, family, and peer antecedents with commensurate neglect of community and other environmental factors (e.g., Wallack and Corbett 1987). However, social norms and the mass media are recognized as important in the social influences model, and, as currently conceptualized, the risk factors model includes attention to school and community (CSAP 1993*b*). Still, neither model may be adequate. Efforts to integrate current knowledge from various disciplines concerning the development of risk for alcohol-related problems in youth indicate that the etiology of adolescent drinking is much more complex than previously supposed. Cultural, social, environmental, and other macrolevel influences, as well as psychological factors and biologically mediated processes, are implicated in the development of alcohol abuse and alcoholism (Boyd et al. 1994).

Efforts to develop an integrated theory of drinking behavior reflect this complexity (Wagenaar and Perry 1994), but research on alcohol use by rural youth generally has not. An important exception is the Iowa Youth and Families Project that, through longitudinal research, has developed and rigorously tested a theoretical model relating rural economic hardship to parental emotional distress, hostile spousal and parent-child relationships, unhealthy influences on adolescent development, and adolescent antisocial behavior (Conger et al. 1994; Conger and Elder 1994; Skinner et al. 1992). As part of this work, Conger and colleagues (1991) have shown that marital conflict resulting from economic hardship is directly related to alcohol use by rural seventh graders.

Results also suggest that economic pressure leading to hostile and irritable parental interactions with children indirectly contributes to youthful alcohol use by fostering children's association with antisocial friends who play a direct role in drinking experimentation.

Other investigators have proposed that theories of culture, acculturation, and stress are relevant to understanding alcohol use by youth (LaFromboise 1988; Moncher et al. 1990; Schinke et al. 1988a). Some research also has investigated aspects of the rural environment that may influence teenage drinking. These considerations direct attention to the ecology of drinking by youth in rural areas.

ECOLOGY OF ALCOHOL USE BY RURAL YOUTH

As Steinberg (1991) has pointed out, prevention programs need to take into account adolescents' place in the society in which they live and not focus solely—as most now do—on the development of individual cognitive or social skills. Thus knowledge is needed about the roles of adolescents in rural America, as well as about the ways that alcohol use in rural environments is associated with transitions from childhood into adolescence and then from adolescence into adulthood. Gaining such insight, in turn, requires a better understanding of how alcohol use fits into rural culture. Although little is known about these topics, some elements can be identified that are relevant to developing an ecological perspective on drinking by rural youth.

Sources of Information About Alcohol and Other Drugs

Messages in the environment socially construct the meaning of alcohol use and its consequences. According to Gitlin (1990, p. 32), "[T]he meaning of a given drug to the people who use it, even the experience of the drug itself, differs considerably from one society, one sector, one group, even one moment in time to another." Knowing what rural children and youth learn about alcohol from their surroundings is important.

Two surveys of rural school children suggest that sources of alcohol and drug information vary in different communities and that the amount and possibly the type of information received also may vary by age and gender. Among 8th and 10th grade students in small to medium-sized central Texas school districts, males reported receiving more information

about each of six drug categories than females; 8th graders received more information than 10th graders. Television was the primary source of information for all drugs except inhalants. Parents and print media were of secondary importance, followed by friends and teachers. These students were less likely to receive drug-related information from experience, siblings, church, doctors, and police (Mirzaee et al. 1991). Junior and senior high school students in rural northwest Ohio most frequently identified the media and teachers at school as sources of drug and alcohol information (18.8 percent each); next were friends (11.2 percent), personal experiences (7 percent), and parents (6.9 percent). Only 3 percent named siblings or alcohol and drug agency personnel as their primary information sources, but 23 percent cited "other" as a potential source of information. No major differences were found between the information sources cited by males and females. However, nearly 18 percent of those responding said that they did not know much about drugs and alcohol (Sarvela et al. 1988b).

The importance of mass media in informing rural youth about alcohol use indicates that influences on their drinking behavior are by no means restricted to the rural environment. Rather, information about drinking norms and values is obtained not only from family, friends, and neighbors in physically proximate "horizontal" communities but also from television and other forms of mass communication originating in distant "vertical" communities (Gardner and McColgan 1990). Although these media may convey some public service prevention messages, through commercials and regular programming they also portray alcohol use as a normal and desirable part of American living (Atkin et al. 1984; Breed and De Foe 1981; De Foe et al. 1983; Gerbner 1990; Greenberg 1984; Greenberg et al. 1984; Wallack et al. 1990). Additionally, the media are a ready source of the nonconformist role models referred to by Napier and associates (1984). Further, Gitlin (1990) has argued that both the mass media and substance use embody the same values in American culture:

In the context of a society that so deeply values material acquisition, television cultivates a thirst for goods. And yet, since means are limited and pleasures evanescent, television also helps generate appetites that cannot be fulfilled. American culture therefore opens up a gap between media-nourished expectations of gratification and experience that fails to meet them. One attempt to bridge that gap is drug use (p. 46).

In reporting sources of information about alcohol and drug use, young people may fail to acknowledge the pervasive messages that Gitlin described or the information they receive about drinking through observations of everyday life in rural areas. Nevertheless, the availability of alcohol in the community, its packaging and pricing (Wallack and Corbett 1987), the prevalence of alcohol use in various subgroups, the functions served by this behavior, and actual consequences of drinking, both positive and negative, are more constant and compelling sources of information than structured prevention messages. This is so because youth alcohol use is social behavior learned from and regulated by the social environment (Akers 1992; Perry 1986; Smith and Goldman 1994; Wagenaar and Perry 1994).

For this reason, officials of rural school districts have expressed concern that parents and the community undermine the effectiveness of drug education programs. In one case, district officials thought that serving champagne to parents who were planning a drug-free party for graduating seniors sent a mixed message to students, but parents disagreed (GAO 1992b).

The Why, Where, When, and How of Drinking by Rural Youth

Although scanty, information about motivational and situational factors associated with drinking by rural youth suggests that messages about alcohol use in some rural communities are far more pervasive and powerful than those transmitted by parents sipping champagne.

Youth Motivation and Drinking. Few studies have investigated the rationales adolescents in rural areas use to explain either the initiation or the continuation of their drinking, but Binion and colleagues (1988) compared Indian and non-Indian eighth grade students on the importance they attributed to 13 possible reasons for using alcohol. Pleasant sensations, being with friends, and excitement were important to both groups, but Indian youth appeared to attach more importance to reasons related to alleviating boredom than did non-Indians. On the other hand, more non-Indian than Indian students saw alcohol use as important for parties.

Recognizing that, in light of the acquired immunodeficiency syndrome (AIDS) epidemic, drinking large amounts of alcohol and engaging in sex after one's judgment is impaired can be a lethal high-risk behavior, Conner and Conner (1992) explored the expected benefits of alcohol use

on sexual behavior among 42 Native American teenagers attending a week-long intertribal powwow. Their survey was conducted as part of a prevention project designed to reduce adolescent use of alcohol and other drugs at the powwow, but 40 percent of the respondents reported drinking during the week. Drinking was not related to the expectation that alcohol reduces anxiety in interacting with the opposite sex, but heavy drinking was associated with the belief that alcohol makes sexual experience more enjoyable. The authors concluded that more than safe sex education is needed to protect these adolescents.

Self-medication and emotional regulation have been identified as motives for alcohol use by urban adolescents, and their drinking also has been linked to minority group status, stressful life events, loss of control, and loss of life meaning (Newcomb and Harlow 1986; Schinke et al. 1988a). In rural areas, Native American youth are particularly subject to stress from poverty, prejudice, and lack of economic, educational, and social opportunity (Beauvais et al. 1989; Oetting et al. 1989; OSAP 1990). Blum and colleagues (1992) related these conditions to a sense of hopelessness observed among even the most successful Native American and Alaska Native youth from rural reservations and communities. Nevertheless, as previously discussed, Swaim and associates (1989) found that anger was the only dimension of emotional distress linked to alcohol involvement of rural Indian high school students, and that correlation was negative. Because anger also was positively related to self-esteem, the authors commented that Indian youth have a great deal to be angry about and those with positive self-esteem may be most able to express this anger. This same dynamic may explain why anger was inversely related to associations with alcohol-using peers and drinking. Based on this and other work, Oetting and coworkers (1989) rejected the hypothesis that much alcohol use occurs because youth are self-medicating for depression, anxiety, or inadequate self-esteem, even when acculturation stress might be influencing these characteristics.

Napier and colleagues (1981) found life crises modestly correlated with alcohol use among high school students in rural Ohio. Workman and Beer (1992b) reported that rural Kansas high school students from divorced and alcoholic homes had higher depression scores than students from nondivorced and nonalcoholic homes, and in this small sample, depression was correlated with alcohol dependency. Reasons given by rural Nebraska high school students for alcohol and drug involvement included depression and hopelessness, as well as inability to control oneself, life demands, family finances, and pressure (Cohen 1987).

Social Contexts for Drinking. Drawing upon Social Learning Theory (Bandura 1977, 1986), Thombs and colleagues (1994) developed a social context concept to explain how intrapersonal variables such as beliefs, expectancies, and moods interact reciprocally with situational variables such as time of day, location, and contact with peers to shape teenage alcohol use. According to these investigators:

Distinct social contexts may be identified by the way in which certain internal motivations tend to combine with complimentary social situations. For example, on weekend nights, teenagers are more apt to drink alcohol to have fun and excitement, whereas drinking on a weekday, after school and work, would more likely be linked to stress relief (p. 73).

In a study of 1,228 students in 7th through 12th grades from rural New York, Thombs and colleagues (1994) examined the ability of five social context scales to discriminate the intensity of youthful drinking, driving under the influence, and riding with intoxicated drivers. High-intensity drinkers were separated from low-intensity ones by frequent drinking to enhance fun at social gatherings, as well to reduce negative feelings. High-intensity drinkers were separated from moderate-intensity ones on the basis of drinking on school grounds to defy school and adult authority. The school defiance and stress control measures most clearly separated drinking from nondrinking drivers, but drinking to have fun and to defy parental authority also made a contribution. Drinking to have fun and to control stress best separated youth who did and did not ride with an intoxicated driver, while peer acceptance, parental control, and school defiance made additional contributions.

Thombs and colleagues (1994) concluded that teenagers prone to abuse alcohol not only display different patterns of alcohol intake but they also differ with regard to where, when, and why they drink. Adolescents who drink frequently to enhance sociability and have a good time at parties, to medicate against negative self-thought and mood, and to rebel against authority comprise a high-risk group inclined to drink to excess, experience a significant number of alcohol-related problems, and drive while impaired by alcohol.

Use of Time and Drinking. Officials from many rural school districts advised the GAO (1992b) that virtually all student drug use occurs after

school hours or on weekends. Several officials said that rural youth use drugs because they have nothing else to do.

A survey of rural junior and senior high school students in a mid-Atlantic State revealed that time spent socializing was related to time spent driving around in a car and to the amount of alcohol consumed on several occasions—when others are drinking and adults are not present, before going to a party or on a date, on special occasions, and when no one else is around. Time spent working and playing video games also was positively related to several of these drinking situations, as well as to the amount of alcohol consumed at dinner or at home with the family. Time spent studying was negatively associated with all occasions for drinking except those involving the home and family. Time spent in extracurricular activities and frequency of attendance at religious services also were negatively correlated with alcohol consumption in several situations (Gibbons et al. 1986b).

Where Rural Youth Obtain Alcohol. As Beauvais and colleagues (1989) have observed, if lifetime use prevalence is high, a drug is clearly available and accessible. However, just four of the studies reviewed provided information on where rural youth obtain alcohol. Among rural New Hampshire elementary school children who reported drinking and who also provided information about their source of alcohol, 88 percent said they procured it from their families or took it from home without permission. These children were most likely to drink at home, although not necessarily with other family members (Stevens et al. 1991). Kelleher and associates (1992) found that young adolescents living in the Arkansas delta had less access to alcohol than same-age students living in a city, a suburb, or the Ozark highlands. Delta boys reported more sneaking or buying of alcohol themselves, and they also reported less frequent drinking than boys from other areas.

Two focus groups held with college undergraduates recruited from rural communities in the upper Midwest yielded rich information about the processes through which rural youth obtain alcohol (Wagenaar et al. 1993). Focus group members said that for initial drinking, older siblings and friends were their most frequent source of alcohol, typically at parties. Occasionally they obtained alcohol from parents' supplies in the home, with or without permission. Some parents supplied alcohol to their underage children in exchange for agreements to consume the alcohol at home instead of at parties or in bars and taverns. This was most likely to occur on special occasions, such as graduation parties.

Parties were the major source of alcohol during the high school years. These events were frequently held outdoors in such rural environs as gravel pits, vacant fields, and woods. Older adolescents and young adults usually obtained the alcohol for these parties, where they welcomed younger teens and "broke them in" by encouraging them to become very intoxicated. In some communities, adolescent entrepreneurs would purchase kegs of beer and publicize the time and location of a party, splitting profits from a nominal fee per glass or a single price of admission. Younger attendees were charged more than older attendees because they were willing to pay more. Focus group participants also reported frequent drinking on road trips, described as "when you get a couple cases of beer, get a bunch of guys and girls in a car and drive around and drink" (Wagenaar et al. 1993, p. 461). Informants additionally provided detailed information on strategies underage youth used to purchase alcohol from commercial outlets. If clerks were not known personally, alcohol was typically purchased outside the community of residence.

In pilot studies of new instruments and data-collection procedures, Wagenaar and colleagues (1993) have confirmed the role of noncommercial sources in supplying alcohol to rural youth. In a sample of 560 eighth graders, 88 percent of males and 83 percent of females reported it was easy or moderately easy to sneak alcohol from their home, while 92 percent of males and 93 percent of females reported that it was easy to get at parties. Another study from rural Minnesota found that alcohol was also easy to obtain commercially: Girls appearing younger than 21 years were successful in 47 percent of 336 attempts to purchase alcohol without age identification (Perry et al. 1993).

Concerns of Rural Youth. Only one study was found that examined the perspectives of rural youth on their own problems and resources. Recognizing that such information is needed to plan youth services, some years ago House and associates (1979) surveyed junior and senior high school students in a poor, rural county of North Carolina. Students most frequently expressed personal concerns about use of free time, appearance, relationships with parents, and emotional stress. Drinking too much alcohol was a personal concern for fewer than 3 percent of these students, and while nearly 20 percent attributed concern about substance use to their classmates, smoking was thought to be a more frequent worry than alcohol or other drug use. Although approximately 50 percent of the adolescents in the county were excluded from this survey because they left school before completing the 10th grade, those

who did participate expressed relatively less concern about academic problems, drugs, and sex than urban adolescents.

Macro Characteristics of the Rural Environment

With the exception of the paper by Conger and colleagues (1991), no research was discovered that relates macro characteristics of rural America to alcohol use by rural youth. To rough out a more complete ecological perspective, this section identifies some of these larger forces and considers ways that they may be associated with drinking by rural adolescents.

Rural Poverty. Alcohol use and other adolescent problem behaviors are disproportionately concentrated among economically disadvantaged and minority youth in both urban and rural areas (Steinberg 1991). Very few studies of rural youth have examined the relationship of socioeconomic status to drinking, but Gibbons and associates (1986a) found that 50 percent of rural students from families receiving public assistance had their first drink by age 10, whereas only 30 percent of children from nonassistance families were this young when they initiated drinking. By age 13, almost all youth (96 percent) from families receiving assistance had initiated drinking, compared to 67 percent of adolescents from nonassistance families.

Rural families are more likely to live in poverty than urban ones. In 1987, the average family income in rural areas was only about 75 percent of the average urban family income and more than one out of every six rural families lived in poverty, as compared to one out of eight urban families (Weisfeld 1993). Child poverty rates in nonmetropolitan areas also exceed those in metropolitan ones. The growth of female-headed families in rural areas accounted for roughly 60 percent of the rise in child poverty during the 1980s (Lichter and Eggebeen 1992).

Much rural poverty is in areas with chronically depressed local economies where per capita incomes have remained in the bottom fifth of all U.S. counties for several decades (Braden and Beauregard 1994). Since 1979 the unemployment rate has been higher in rural than urban areas. This is related not only to vast farm foreclosures, but also to the cyclic boom-and-bust economies of the agriculture, timber, mining, and energy industries and to increasing dependence of rural communities on manufacturing and other sources of income (Human and Wasem 1991). In 1920, three-fifths of the rural population were farmworkers (Reynolds et

al. 1976); at present, the rural nonfarm population outnumbers the rural farm population by approximately seven to one. In 1991, only 13 percent of rural residents lived in farming-dependent counties (Human and Wasem 1991).

The effects of continuing economic strain on alcohol use by rural youth are poorly understood, although the work of Conger and colleagues (1994) points to the importance of the family in this dynamic. Based on extensive interviews with school administrators, teachers, and students in rural Iowa, Elliott (1988) has reported that rural students at educational risk are deeply affected by the isolation and the economic decline present in most rural communities. In 1990, school dropout rates among 16- to 24-year-olds were 13.6 in nonmetropolitan areas compared to 17.0 in central cities and 10.7 in suburbs, but poverty appears to have larger effects on dropout behavior in nonmetropolitan than suburban areas. Family structure also seems to have a strong influence on the educational achievement of rural youth (Lichter et al. 1993). The median educational levels of young adults in nonmetropolitan areas declined during the last decade (McGranahan and Ghelfi 1991); however, in part this reflects the exodus of educated youth to cities.

Rural Migration. The U.S. population was predominantly rural until 1920, but due to continuing migration to cities, by 1970 only one-fourth of the Nation's population lived in rural areas. In-migration, largely from urban retirees, increased the rural population somewhat during the 1970s, but then rural areas apparently lost some quality-of-life attractiveness. At present, in- and out-migration are almost balanced (Murray and Keller 1991). These figures do not adequately convey the massive effects of migration on rural life. From 1920 to 1988, the U.S. farm population dwindled from 31 million to 5 million residents. The population of small towns grew through the 1970s, but hard times then hit many. Between 1980 and 1990, more than half of all rural counties lost population (Murray and Keller 1991; Weisfeld 1993).

Older adolescents, young adults, and those in their middle years are most likely to leave rural regions, and, as a result, the young and the old account for greater proportions of the population in rural than urban areas. In 1987, persons between 6 and 17 years of age constituted roughly 20 percent of the population in nonmetropolitan and rural² regions, but only 15 percent of core metropolitan and 17 percent of other metropolitan residents. In this same year, over 14 percent of the rural population was age 65 or older, compared to approximately 12 percent

of core and other metropolitan residents and only about 10 percent in urbanized nonmetropolitan areas (Braden and Beauregard 1994).

Very different prevention programs may be needed for youth who intend to remain in the rural environment where they grew up and those who hope to leave it. For example, youth who intend to stay in a rural area may be more influenced by local drinking customs whereas those who intend to go may be more influenced by their perceptions of city living. Youth whose decision about staying or leaving is dictated by poverty may drink more than youth with greater freedom of choice about their future. And as some youth actually move away, the transition may increase risk of alcohol use both for those who enter urban environments and those who stay in rural areas depopulated of old friends.

Rural Youth and Work. Bachman and Schulenberg (1993) have reported that work intensity among youth is positively correlated with drinking alcohol, smoking cigarettes, using illicit drugs, interpersonal aggression, theft, victimization, trouble with police, arguments with parents, and lack of sleep, exercise, and educational success. Whether such relationships characterize rural youth is yet to be determined. Compared to male and female students living in large urban areas, youth living in small towns and in the country are less likely to be employed.

Rural youth who work also may be employed under very different circumstances than in urban and suburban settings. For example, seasonal labor may foster alcohol use by rural youth not only because it provides disposable income, but also because it socially integrates local adolescents with older farmhands and itinerant laborers who customarily drink after work or in town on weekends (Chi and McClain 1992). An additional possibility is that rural youth, more than their urban counterparts, work because of family necessity. Nearly 13 percent of rural adults, compared to about 10 percent of urban adults, cannot work at all because of health problems (Braden and Beauregard 1994). Adolescents in the Iowa Youth and Families Study were more likely to engage in both household work and paid employment when their families experienced significant economic pressure and when mothers pursued employment outside the home. Farm boys in particular pursued paid employment and they were the only youth in the study who were more positively perceived by parents as a function of their employment (Conger and Elder 1994). Youth forced to work to contribute to family subsistence may prematurely assume adult roles, including adult drinking behaviors.

Alternatively, they may drink to escape or rebel against the burden of work and family responsibility.

Changes in Rural Communities. Farm mechanization, industrial development, and increased reliance on the automobile have been accompanied by a movement away from traditional rural social structures. Needs that formerly were met by the small, local community are now met by distant and more formal agencies, employers, and commercial enterprises. Murray and Keller (1991) have pointed out that the subtle urban transformation of many rural areas and the decline of local community service structures have also created a decline in the natural support systems that have traditionally been present in rural communities. For example, decreasing proportions of rural Americans participate in the cooperative problemsolving of granges, churches, and other civic groups. Changes in communication patterns and the geographic dispersal of extended families away from rural farms and towns also have strained traditional sources of natural support.

Lack of Rural Resources. The relative lack of resources in rural communities constitutes a double-edged sword for alcohol use prevention. Reynolds and associates (1976) found much truth in the commonly repeated lament, "There just ain't nothing here for young folks." Limited access to employment opportunities and to the diversions and activities found in urban environments undoubtedly encourages rural youth to create their own entertainments, including drinking parties and road trips. At the same time, as the GAO has observed, low population density is incompatible with high-intensity approaches to prevention (Wargo et al. 1990).

Gibbons and colleagues (1986a) have argued that due to the lack of financial and treatment resources in rural areas, schools must play a pivotal role in prevention. Nevertheless, many rural school districts are small and resource poor. Such districts often lack the tax base and other resources needed to recruit and retain talented, well-educated teachers, maintain facilities, and provide for the unique needs of children (Weisfeld 1993). The costs of packaged prevention programs may be prohibitive (Rhodes and Jason 1988). After-school programs may not be feasible in some areas because of the need to bus children to their homes. In some rural communities, low educational aspirations and negative experiences of youth and their parents with the school system also limit the potential of school sites for prevention programming (Youth Health Service 1994).

Few rural communities can afford alcohol and drug program specialists (Wargo et al. 1990). In 1988, over 80 percent of rural hospitals had no alcohol and chemical dependency services whatsoever, and nearly that proportion had no psychiatrist on medical staff (Mick et al. 1993). Psychologists are concentrated in urban areas (Murray and Keller 1991). Due to the lack of these and other human resources, professional workers in rural areas must be generalists. Rural teachers must perform a wide variety of educational services; rural health care workers must provide a broad array of health services; and rural police must handle the full range of law-enforcement problems. Wargo and associates (1990) have cautioned that individuals in these jobs, no matter how dedicated, can hardly be expected to develop expertise in, or devote much time to, drug issues. Collaboration has been identified as essential to effective rural programming (Helge 1990; Laws 1991; Wargo et al. 1990), but limited funding for all youth services can cause turf battles and failed collaborative efforts (Youth Health Service 1994).

Rural Culture. Rural people are known as self-sufficient, self-reliant, and distrustful of outsiders (Human and Wasem 1991). Rural areas also have been characterized as more conservative, religious, unified, and family centered than urban ones (Kelleher et al. 1992; Reynolds et al. 1976). For these reasons, prevention programs may lack acceptance or encounter great resistance in some rural schools and communities (Richmond and Peeples 1984; Wargo et al. 1990).

Informal social controls are thought to be stronger in rural communities than in cities (Lichter et al. 1993), but Kelleher and associates (1992) have suggested that social sanctions against youthful drinking may vary by gender and rural region. Observing that the drinking patterns of young girls living in the Arkansas Delta differ from those of girls in the Ozark highlands, these investigators proposed that in more socially conservative, traditional, and isolated communities, young women of childbearing age may receive fewer rewards and more punishing feedback for drinking. This hypothesis is consistent with Sarvela and McClendon's (1987b) finding from upstate Michigan that more girls than boys felt guilt after drinking. However, it is also possible that strict social controls foster rebellion and thus encourage teenage drinking.

Reynolds and colleagues (1976) have suggested that rigid social restrictions in rural areas are analogous to the physical restrictions of an urban ghetto. They observed that strict behavioral codes combine with primary face-to-face relationships and a predilection for "visiting"

(gossip) to produce a skeleton in almost everyone's closet. One consequence is that local professionals do not, or are not permitted to, function at maximum capacity (Reynolds et al. 1976). Smalltown social networks also make maintaining client confidentiality and anonymity difficult (Youth Health Service 1994).

Reynolds and colleagues (1976) were unable to explain the tolerance of rural communities toward the considerable number of residents with measurable mental illness; however, at another point in their book, they remarked that aberrant behavior is met with standard rationalizations. This suggests that, despite strong verbal expressions of strict behavioral standards, some rural communities may in fact tolerate a great deal of deviance. By assuring a continuous supply of fresh material for visiting, such a convention could function culturally to foster extended social interactions among otherwise isolated community members.

Yet another possibility is that some rural communities regard teenage drinking as normative rather than deviant behavior (Bloch et al. 1991). Giesbrecht and Pranovi (1986) reported from experiences in small Ontario towns that normal drinking is broadly defined and deviant drinking is identified *ex post facto*. Neither concept appears to have a quantitative referent. Instead, people seem to assess others by their actions and interactions in relation to alcohol, and not primarily by the amount of alcohol consumed. Further, these investigators found that drinking is linked to notions of personal rights, privileges, and status. Rural residents believe that hard work or vigorous play deserves a reward, and drinking is a commonly acceptable form of taking and receiving rewards. These themes characterize general Western culture, from which rural American culture cannot be separated. Thus Gerbner (1990) has pointed out:

In Western art and literature, drinking tends to be associated with relaxation, sociability, and coping with the rules and pressures of the game of life; drunkenness, with testing or breaking those rules . . . Advertising and the portrayal of drinking in general media content play on such associations. In so doing, they form the most pervasive common cultural bases for cultivating assumptions about drinking in American society (p. 98).

Minority youth are influenced both by modern American culture and by the traditional culture of their ethnic group. May (1986) has explained

that most Native Americans, particularly the young and middle aged, therefore must cope with two systems of social control, and proposed that Indians who have meaningful roles in both modern and traditional cultures are least susceptible to alcohol and other drug misuse. Those who are well integrated into one world but not the other also have low susceptibility, but not so low as the first group. Indians who are marginal to both cultures are at greatest risk for substance abuse. Wright and Watts (1985) discussed ambivalence in American culture toward alcohol, ethnic minorities, and youth to make the point that all three terms are socially loaded. These authors concluded that alcoholism among minority youth cannot be understood apart from their environment and life conditions.

Rural Diversity. The preceding discussion indicates that numerous macrolevel forces in the social environment may affect the ecology of alcohol use by rural youth. Specific influences on drinking are likely to vary with the interaction of these forces in particular communities. Diversity in the factors affecting alcohol use by rural youth therefore should be expected, for rural America is extremely heterogeneous.

Rural poverty, for example, is not equally distributed. Of 242 nonmetropolitan U.S. counties with chronically depressed economies, 224 are located in the South (Bender et al. 1985). Some rural areas contain significant numbers of ethnic minorities, often physically isolated with special social service needs (Murray and Keller 1991). Rural communities are also heterogeneous with respect to age structure, occupations, culture, religiosity, lifestyles, distance from metropolitan centers, geographic terrain, population density, transportation and communication linkages, and many other variables that may affect the development and prevalence of youthful drinking. Not the least of these is adult alcohol use prevalence, for adult drinking rates vary widely in rural areas (Blazer et al. 1987; Mick et al. 1993).

EFFORTS TO PREVENT ALCOHOL USE BY RURAL YOUTH

Efforts to prevent alcohol use by rural youth mirror the diversity of rural people, schools, and communities. Variations in objectives, sponsorship, age groups targeted, settings, and activities make these programs difficult to classify. Ultimately, each is unique. Once this is acknowledged, some general observations can be made about rural prevention programs described in the literature. These are followed by a more detailed

description of rural school- and community-based prevention efforts, as well as a brief section on policies relevant to alcohol use by rural youth.

Very few rural programs focus solely on the prevention of youthful drinking. Instead, the prevention of alcohol and other drug use are approached together. Goals and objectives tend to be generally rather than specifically stated and to vary with program sponsorship. Projects supported by CSAP are required to endorse a philosophy of youth abstinence from substance use. Almost all of these projects are based on the risk factor model and try to reduce at least two risk factors from different domains. Information is not readily available on the risk factors targeted by CSAP grantees in rural areas, but, in 1993, the percentage of all CSAP projects addressing each risk factor domain was as follows: individual, 70 percent; family, 50 percent; school, 50 percent; peer, 40 percent; and neighborhood/community, 40 percent (CSAP 1993*b*).

The relatively few rural prevention programs organized by university researchers have aimed to delay the onset of smoking and drinking and to reduce use prevalence of tobacco, alcohol, and sometimes marijuana among youth in particular grades, usually seventh. These programs have been guided by social normative theory, and most have been implemented in school classrooms using diverse instructional and skill-building techniques. Project Northland, a 5-year research and alcohol use prevention project now being conducted by investigators from the University of Minnesota in the northeastern area of that State, is applying social normative theory on a larger scale. With funding from NIAAA, this project will test the extent to which simultaneous implementation of school and peer-led curriculums, parent involvement, and community-based activities changes social norms about youthful alcohol use and effects a related drop in the prevalence of youthful drinking (Perry et al. 1993; Wagenaar and Perry 1994).

Alcohol use prevention programs conducted by rural school districts and communities without outside sponsorship understandably are more limited in scope. Most such programs are not based on an explicit theoretical framework, but rather reflect reasoned assumptions about what is needed and creative use of available resources. Programs sponsored by local service organizations usually try to coordinate referrals and treatment resources. Those organized by civic groups often strive to prevent alcohol and other drug use by developing youth leadership or by providing young people with new options for recreation and employment. One apparently cosponsored program sought to help Native American

youth at high risk of drinking monitor and moderate their alcohol use (Carpenter et al. 1985).

When descriptions of rural alcohol prevention programs for youth are considered against the larger literature (e.g., Bangert-Drowns 1988; Gardner et al. 1994; Hansen 1992, 1993; Moskowitz 1989; Polich et al. 1984; Schaps et al. 1986; Tobler 1986, 1992; GAO 1992a), no distinctively rural strategy can be identified. Rural prevention efforts appear to cover the spectrum of approaches found in urban areas; however, no data are available on the proportion of rural youth exposed to each type of program or program component.

No descriptions of rural prevention programs for African-American, Asian-American, and Hispanic youth were found in the literature review. On the other hand, almost all substance use prevention programs for Native American and Alaska Native youth have been organized on reservations and in nearby rural communities and school districts (Indian Health Service 1987; May and Moran 1995; OSAP 1990). These programs employ the full range of strategies characterizing prevention initiatives in general, but most also include efforts to help Indian youth understand and take pride in the history, values, and culture of their people. Methods include incorporating cultural symbols in program materials and activities; learning traditional songs, dances, ceremonies, rituals, and crafts; visiting cultural resources; and attending tribal events such as feasts, fairs, and powwows (CSAP 1993b; OSAP 1990). Some programs involve Indian elders or other community leaders in activities. Others have been initiated, planned, and implemented by Indian leaders either for youth specifically or for all members of their community (Gardner et al. 1994; OSAP 1990).

School-Based Programs

Because the great majority of young people are enrolled in school, alcohol and other drug use prevention programs for youth across the Nation are concentrated in this setting (NIAAA 1994a). Although only one-third of America's children are rural, two-thirds of U.S. school districts are located in rural areas (Laws 1991). In 1990 to 1991, an estimated 96 percent of these 8,913 rural districts provided at least three types of drug education for students. Classroom instruction was a program component in nearly all districts, augmented variously by extracurricular activities, drug-free social events, and intervention services. In addition, many rural school districts conducted training

programs for teachers and staff, parent programs, and educational programs in the community (GAO 1992b). The degree to which these efforts focused specifically on the prevention of alcohol use is unknown.

The inclusion of multiple components in school-based prevention programs is thought to increase their effectiveness (NIAAA 1994a). As currently conceptualized, these programs therefore should provide factual information about the harmful effects of drugs, support and strengthen students' resistance to using drugs, carry out collaborative drug abuse prevention efforts with parents and other community members, and be supported by strong school policies as well as services for confidential identification, assessment, referral to treatment, and support groups for users. Such support is often provided through a student assistance program (DHHS 1991).

School-based alcohol use prevention programs in rural areas appear to include some, but not all, of these elements. Although the rationale for specific activities differs, collectively they are often justified in terms of strengthening factors that protect young people against substance use and reducing factors that place them at risk (Gardner et al. 1994). Evaluation of these approaches is generally lacking.

Classroom Instruction. According to a survey conducted by the GAO (1992b) during the 1990-91 school year, 99 percent of rural school districts provided classroom-based drug education, but most limited this instruction to students in selected grades. Classroom education generally covered the effects of alcohol and drug use, as well as the development of life skills such as decisionmaking. Some districts taught these topics through regular subject matter areas such as health or science; others purchased a specific curriculum package that was delivered to students in a special class. About 37 percent of the districts used at least part of a model curriculum for drug use prevention distributed free of charge to public and private schools by the Department of Education in July 1990. No data were collected on alcohol-specific education or on the methods, duration, or effectiveness of classroom drug education.

Affective education figures prominently in descriptions of alcohol use prevention demonstration programs based in rural schools. This approach, guided primarily by humanistic psychology, emphasizes the development of personal capabilities such as self-esteem, skill in making decisions and solving problems, and understanding how alcohol use can interfere with personal values and goals (Bangert-Drowns 1988; Hopkins

et al. 1988; Kim 1988; Schaps and Slimmon 1975; Tobler 1986). Sarvela and McClendon (1987a) found that a mixed affective-cognitive drug education program had no effects on substance use rates or related health beliefs among 265 sixth and seventh grade students in rural northern Michigan and northeastern Wisconsin. This result is consistent with those from evaluations in urban areas indicating that programs based on the affective model have little or no impact on youthful alcohol and other drug use (Hansen 1993; Hopkins et al. 1988; Kim 1988; Moskowitz 1989; Tobler 1992). Nevertheless, this approach has been adopted by entire States (Tobler 1992), and Helge (1990) recommends it above all others for rural schools.

Collins and Cellucci (1991) tested a program on drinking and driving for 52 rural South Carolina students in the 11th and 12th grades. At 1-month followup, students who received the educational program with or without professionally produced public service announcements demonstrated greater knowledge than students in a control group, but no effects on attitudes or alcohol involvement were observed.

The literature contains very few reports of theoretically driven, research-based alcohol prevention curriculums implemented in rural classrooms. Dignan and colleagues (1985) tested a program based on the social influences model with seventh graders in rural North Carolina and found no effects on alcohol use. Evaluating a different social influences program in urban, suburban, and rural schools in Oregon and California, Ellickson and colleagues reported only short-lived effects on alcohol use by seventh graders (Bell et al. 1993; Ellickson and Bell 1990; Ellickson et al. 1993). Both of these evaluations observed a boomerang effect in that the attitudes or substance use behavior of some students exposed to the program changed in the unintended direction.

Gilchrist and associates (1987) tested a life skills curriculum in reservation and nonreservation schools in the Pacific Northwest, and Botvin and associates (1995) reported findings from a longitudinal trial of another life skills curriculum with students from urban, suburban, and rural schools in the eastern United States. Both programs showed positive effects on alcohol use, but neither these evaluations nor the one by Ellickson and associates distinguished rural and urban youth in data analysis.

Schinke and coworkers (1988b) evaluated a prevention program that taught bicultural skills to Native American youth from reservations in

western Washington. Sites were randomly divided into treatment and control conditions, and youth in the treatment condition received 10 group training sessions on bicultural competence. The authors found modest support for this approach. At 6-month followup, exposure to the program was associated with lower alcohol use as well as more knowledge about alcohol and other drug use, higher levels of self-control, and greater assertiveness.

After comprehensively reviewing efforts to prevent alcohol misuse among Native Americans, May and Moran (1995) concluded that in recent years most prevention programs for this population have been school-based initiatives that emphasize information about the effects and consequences of substance abuse. Programs such as "Here's Looking at You," "Project Charley," and "Babes" have been used in many Indian communities both on and off reservations, but with little evaluation of these or other approaches. A survey by the Indian Health Service (1987) and an OSAP (1990) publication provide more detailed program descriptions.

Extracurricular Activities and Drug-Free Social Events. In 1990-91, over 80 percent of rural school districts reported holding drug education assemblies with guest speakers, most of whom discussed their own drug abuse problems. Approximately three-fourths of these districts held a "red ribbon drug awareness week" during which the drug-free message was emphasized through a variety of activities and special events. Student drug awareness clubs and drug education workshops were organized by over half of the districts, and about 30 percent held drug education camps. Smaller percentages reported drug awareness balloon launches and parades. Over half the districts sponsored drug-free prom night activities and about 34 percent sponsored similar activities the evening of graduation (GAO 1992b). Yet another approach is illustrated by a project implemented in five rural high schools in Lake County, California: Groups of peer helpers led by a core group of counselors at each school planned their own agendas for school and community service (CSAP 1993b).

Student Intervention Services. During the 1990-91 school year, 91 percent of rural school districts provided drug abuse counseling to individual students. About half the districts had student support groups facilitated by professionals from local drug and alcohol agencies or trained volunteers. Peer helpers were available in 39 percent of the districts. Approximately 50 percent of the districts provided intervention

services as part of a formal student assistance program that included early identification of student problems, in-school services, referral to outside agencies, and followup (GAO 1992*b*). In addition to these activities, some rural substance abuse prevention demonstration programs provided academic tutoring and mentoring for students at high risk of alcohol and drug use (Gardner et al. 1994).

Peer-Managed Self-Monitoring. Carpenter and colleagues (1985) pilot tested a peer-managed self-control program organized in a residential high school to teach responsible alcohol consumption to 30 Native American teenagers who were at high risk for problem drinking. Despite methodological limitations in the study design, results were encouraging: Significant decreases in quantity and frequency of drinking were observed and maintained over a 12-month period following the training. Commenting that teenagers who already drink are unlikely to respond favorably to programs emphasizing abstinence, these investigators encouraged further consideration of the moderation model in prevention programming.

Parent Involvement. Rural schools have attempted to address family-level influences on alcohol and drug use through parent education and direct involvement of parents in prevention programs. All program managers of the Native American and Alaska Native OSAP demonstration grants have reported family involvement, with 50 percent and 31 percent indicating great or moderate involvement, respectively (OSAP 1990). The 1990-91 survey of rural school districts found that about half provided parenting skill classes, but several districts expressed problems in obtaining parent participation, and 39 percent of all districts saw great need to expand their parent programs (GAO 1992*b*). Very little research has assessed the effects of parent programs on children's alcohol use behavior (NIAAA 1994*a*), and such studies are methodologically difficult (Klitzner et al. 1990*b*).

Community Involvement. School-based substance use prevention demonstration projects in rural areas report participation not only by teachers, students, administrators, staff, and parents, but also by law enforcement officials, clergy, chemical abuse professionals, county agents, public health nurses, and church and civic leaders (Richmond and Peebles 1984; Wiesner 1988). Some schools also work with community agencies to coordinate health and social services for youth, or to provide them with recreational opportunities, leadership training, and jobs. Such widespread participation has been identified as a key

ingredient of program success (Perry 1986; Wiesner 1988). Nevertheless, the roles of various individuals and groups are not always described, and the effects of their involvement remain uncertain.

Funding. An estimated 86 percent of rural school districts received Federal Drug-Free School funds for school year 1990-91. Most districts that did not receive funds from this source enrolled fewer than 1,000 students and either did not know how to apply for funds or perceived that they did not have a drug problem. Federal drug education grants to rural school districts were relatively small, ranging from \$350 to \$127,000, with a median value of \$5,200. These funds paid for between 2 and 100 percent of the total drug education programs implemented in each district, underwriting a median of 75 percent of drug education costs in large districts compared to a median of 50 percent in small districts. Nearly 90 percent of the districts also reported using district funds for drug education, while over 40 percent received support from private organizations and groups. About one-third of the districts received other State or Federal grants for drug education, and about 25 percent received other public funds for this purpose (GAO 1992b).

Approximately one-fourth of the rural school districts receiving Drug-Free Schools funds had no drug education program before Federal funding became available. Other rural districts had programs, but used Federal resources to expand them. In 1990-91, almost all rural school districts still saw a need for program expansion, but half reported that this could be accomplished without additional funding. The most frequently mentioned unmet needs involved counseling and other intervention services (36 percent) and programs for parents and others in the community (31 percent) (GAO 1992b).

Community-Based Prevention Programs

Community-based alcohol and other drug prevention programs have been organized in rural areas by professionals in schools and community agencies, local business leaders, service clubs, local activists, and external sponsors. Many of these programs involve young people and other members of the community in assessing issues of alcohol use and generating possible solutions. As with school-based prevention programs, community-based efforts to prevent alcohol use by youth vary along many dimensions. Most of these appear to focus specifically on youth and to support, complement, or even substitute for school-based prevention efforts. A few programs approach alcohol use prevention

more comprehensively, but, as illustrated by May and Moran's (1995) review of prevention programs in Native American communities, definitions of "comprehensive" differ widely.

Community Programs for Youth. Some rural prevention programs provide high-risk youth, and at times their families, with education, counseling, case management, and health and social services at one or more community sites (e.g., Youth Health Services 1994). Other rural communities organize drug-free youth groups, retreats, and outdoor adventures to develop youth peer leadership, to foster cooperation among young people, to develop their self-discipline, and to help high-risk youth bond with each other, their schools, and communities (Kneidek 1989; Rhodes and Jason 1988; Schroeder 1988).

Media Campaigns. To broaden the base of support for prevention, most community-based projects try to increase community awareness about alcohol use prevalence and related problems, and some have conducted local media campaigns for that purpose (CSAP 1993b). Moffatt and colleagues (1989) also have reported a multimedia program promoting responsible attitudes toward alcohol use in four small, single-industry towns in northern Ontario. A 5-minute alcohol education film was shown prior to the main feature in independent commercial movie theaters over a 4-month period. This project was evaluated with a viewer questionnaire, but the return rate was less than 30 percent and results were not reported by viewer age.

Community Coalitions. In recent years, community task forces or coalitions have become the preferred approach for planning and coordinating community prevention programs. Examining a variety of such community activation initiatives, Wickizer and associates (1993) found few meaningful differences in the response of urban and rural communities. However, regardless of community size, activation levels varied directly with community income.

Rissel and fellow researchers (1995) identified factors affecting member participation in 10 community coalitions formed in conjunction with Project Northland. Coalition members typically were females who had children and who belonged to a number of other community or social groups. Members were likely to participate more actively in the task forces if they were relative newcomers to the community and if they found their participation satisfying. Satisfaction, in turn, was associated with the amount of control and ownership each member experienced in

the task force and with agreement about the task force's direction. The authors observed that to mainstream task force efforts and to be effective in delaying or preventing alcohol use by adolescents living in smaller rural communities, it may be necessary to recruit members who have lived in these communities most of their lives. Despite methodological limitations, this study represents an important effort to illuminate the dynamics of community participation in rural alcohol prevention projects.

Community Team-Building and Networking. Schroeder (1988) has described 3-day retreats organized by the Alcoholism Council of Nebraska for teams of community leaders, school personnel, and students to facilitate cooperation in reducing alcohol and drug problems in rural communities. The retreats were divided into four major components: team- and trust-building, education and identification of at-risk individuals, a review of successful prevention programs, and a planning session for short- and long-term programs. To keep participating communities in contact with one another, the council published a newsletter, attended team meetings in the communities, and provided 2-day reunion retreats where alumni community teams could share ideas, successes, and failures.

Community Development. Efforts to prevent youthful alcohol use also may result from the involvement of rural residents in comprehensive community self-assessment and improvement projects. Alcohol use may or may not be the central focus of community-development initiatives, but the story of the Alkali Lake band of Shuswap Indians exemplifies what can be accomplished. By revitalizing Indian spiritual and cultural practices, economic self-sufficiency projects, Alcoholics Anonymous, and other therapeutic means, this community reduced the incidence of alcoholism within their population from 95 percent to 5 percent within a 10-year period (Guillory et al. 1988).

Grassroots Movements. During the late 1970s, concerned by an apparent upsurge in alcohol and drug use, thousands of highly visible grassroots groups formed throughout the country to take action against these problems. Groups were of two types, each relating to different national umbrella organizations. In parents' groups, estimated to number between 1,000 and 3,000 by the early 1980s, members sought to educate themselves about youthful drug use and to support one another in enforcing a no-drug lifestyle among their children (Klitzner et al. 1990a, 1990b). Groups against drunk driving, which by 1985 included over 450 local organizations as well as regional and statewide coalitions, sought

through legislation, law enforcement, and education to prevent alcohol-related motor vehicle deaths and injuries (Wolfson 1989). The review conducted for this chapter failed to uncover data on the extent to which rural communities have been involved in these movements.

Participation in Statewide Coalitions. Some States also have organized coalitions to pass legislation related to alcohol prevention objectives. No data on rural participation in such coalitions were discovered, but a case study of a statewide coalition in New Mexico provides insight into ways that residents of rural communities might become involved. Although the New Mexico initiative originated in Albuquerque, the largest urban area in the State, rural residents could join a 200-mile walk of citizens seeking legislative change or a subsequent statewide "Care-a-Van" to the State capital. Media coverage was local, as well as statewide and national. Results of a questionnaire survey of candidates for statewide office were sent to local media and the districts that candidates were representing. A legislative handbook also was created and mass distributed to communities throughout the State. Some rural communities held town hall meetings and hearings on proposed local ordinances. Even where this was not the case, rural residents could offer recommendations to the statewide coalition, call or write their representative in the State legislature, and vote (Stivers 1994).

Policy Approaches

During the 1980s, fueled by the demands of grassroots citizen action groups and the media attention they generated, the U.S. Congress and State legislatures passed numerous laws to reduce the availability of alcohol, regulate conditions for drinking, and impose stiffer sanctions for violations of alcohol-related laws (Grossman et al. 1994; Hingson et al. 1988; Howard et al. 1994; McCarthy 1993; NIAAA 1994a; Sweedler 1990). Federal and State alcohol control laws pertain to youth in rural as well as urban areas, yet reference to them is curiously absent in the rural alcohol prevention literature. No research was discovered describing how these laws have affected rural youth, and little information exists on the effectiveness of law enforcement in reducing drug abuse in rural areas (Wargo et al. 1990). Similarly, no accounts were found of policy initiatives organized by rural communities to prevent or reduce youthful drinking.

May and Moran (1995) have pointed out that prohibition has not been effective in preventing alcohol use by Native Americans, and that this

policy, in fact, may have encouraged alcohol-abusive behavior. These authors reviewed other policy options for Indian communities, noting that many now refuse advertising from beer companies and that powwows have generally become alcohol-free events.

A PUBLIC HEALTH ANALYSIS OF RURAL PREVENTION EFFORTS

This review indicates that most rural schools and many rural communities are engaged, often with creativity and deep commitment, in efforts to prevent alcohol and other drug use by rural youth. At the same time, the prevalence of youthful drinking and heavy drinking in rural areas indicates that something is not working.

A public health perspective directs attention to three potential sources of difficulty: problem definition, program design and implementation, and evaluation of program effectiveness. An assessment of rural prevention approaches reveals weaknesses in each of these areas. However, such analysis also identifies directions for strengthening rural alcohol use prevention policy, programs, and research.

Problem Definition

As currently defined by Federal policies and many rural prevention programs, any alcohol use by persons under 21 years of age is the problem to be prevented. This definition appears to have its origins in data that began to appear in the 1970s showing that young drivers accounted for a disproportionate share of motor vehicle fatalities and that alcohol use was involved in at least half these fatal crashes (Grossman et al. 1994). Because alcohol use by young people was identified as an underlying cause of traffic deaths, the solution proposed was to raise the minimum drinking age to 21 years. By 1988, this policy had been adopted by all States and the District of Columbia (Grossman et al. 1994; McCarthy 1993).

As States passed legislation to raise the drinking age, the problem was redefined as use of alcohol by minors. Problem prevalence was no longer measured by thousands of teenage alcohol-related traffic fatalities, but by millions of youth who had ever used alcohol, "even a sip." Changes in the drinking age further inflated the number of young people affected; between 1977 and 1984, an estimated 4 million youth under age 21 were

transformed into illegal alcohol consumers (McCarthy 1993). The magnitude of the problem thus multiplied manyfold.

A second consequence of raising the drinking age was that the Federal Government identified any alcohol use by persons under 21 years of age as substance abuse (Wargo et al. 1990). Teenage drinking became inextricably tied to the use of marijuana and other illicit drugs. Once more, the problem was redefined and expanded. Youthful alcohol use no longer was a separate issue, but as symbolized by the AOD acronym, part of the alcohol and other drug (AOD) use constellation. Complete abstinence from AOD was adopted as the goal of Federal youth prevention initiatives (OSAP 1989), for as then Secretary of Education William Bennett (1986, p. vi) proclaimed, "Preventing drug experimentation is the key." This goal was institutionalized by creating the Office of Substance Abuse Prevention in 1985³, passing the Drug-Free Schools and Communities Act of 1986, and launching the Partnership for a Drug Free America with Government encouragement, major corporate support, and substantial media attention.

Gusfield (1981, p. 187) has explained the social processes involved in this phenomenon. To create legitimation and functional response to their power and interests, ruling groups socially construct reality and "a set of motives and directions in the ruled." Scientific personnel, journalistic and policy groups, and occupations and movements interpret particularistic data as definitive and generalized scientific knowledge. Language and style of presentation dramatize this knowledge as a certain, definitive, and accurate base for justifiable policies. A moral posture also is commanded or induced. Through this rhetoric, technical and moral realities are created and given form as socially shared facts and values. As cultural hegemony develops, the certitude of the socially constructed reality is not doubted. One perspective on the problem is accepted as truth, and other perspectives are not seen. One system of asking questions about the issue excludes other ways of asking.

Consistent with Gusfield's analysis, alcohol use by rural youth has been subsumed by a socially constructed national drug use crisis. Several assumptions thus have come to be taken for granted.

Youthful Drinking Is AOD Use Behavior. Defining the problem as any AOD use by youth encourages treating alcohol and other drug use as the same behavior. This undoubtedly has been useful in compelling public attention, and as Dryfoos (1990) has pointed out, counts of AOD

"ever users" have been promulgated as public relations symbols for the media and legislators. However, the AOD use concept reduces multiple behaviors to a single abstract variable. Such reductionism obliterates the complexities of youthful drinking practices and the processes through which they develop. Because the behavior to be prevented is inadequately defined, prevention planning lacks precision.

AOD Use by Youth Has Multiple Negative Consequences. Current prevention approaches are based upon the assumption that any AOD use increases the risk that youth will suffer an alarming array of negative consequences. This claim is supported by research evidence indicating that alcohol and tobacco use precedes use of marijuana and other illicit drugs (Ellickson et al. 1992; Kandel 1975, 1982; Yagamuchi and Kandel 1984), that drug use initiation before age 15 increases the risk of dysfunctional use or abuse in later years (Ellickson and Hays 1991; Ellickson et al. 1992; Robins and Przybeck 1985), and that heavy alcohol or illicit drug use leads to a cascade of health and social problems (NIAAA 1994a).

Linking any use of any substance to all of these negative effects underscores the seriousness of the problem as currently defined and highlights the importance of preventing initial AOD use. However, such thinking ignores the epidemiological concept of relative risk. The probability that each negative outcome will occur is not equal. Children and adolescents can readily reach this conclusion themselves by observing the effects of alcohol use on peers, parents, and others in the community. Prevention messages that inflate the dangers of youthful alcohol use therefore may lack credibility. Nevertheless, a priority strategy for national drug control is to "convince children, particularly those at high risk for first-time drug use, that drug use is a dangerous and potentially deadly activity that must be avoided" (Brown 1995, p. 33).

Some investigators hold that the majority of alcohol-related death and disability is attributable to moderate drinkers, not to those who are alcohol dependent (e.g., Moskowitz 1989; Wagenaar and Perry 1994). Others have concluded that experimental AOD use by youth does not appear to be personally or socially destructive (Chen and Kandel 1995; Dryfoos 1990; Kandel et al. 1986; Newcomb and Bentler 1988; Shedler and Block 1990). Although the effects of light or moderate drinking thus remain in dispute, data clearly show that the great majority of young people who drink experimentally or lightly do not become heavy or problem drinkers, go on to use illicit drugs, or engage in other problem

behaviors. These and other negative consequences are related to the frequency, amount, and duration of youthful alcohol use (Hansen and Graham 1991), as well as to other factors. Progression to alcohol abuse and alcoholism, for example, has been attributed to personality characteristics, family dynamics, social and economic factors, and genetics (Miller 1984). Motor vehicle crashes result not only from alcohol use, but also from interactions with traffic, vehicle, and road conditions (Gusfield 1981).

Prevention experts have recommended that experimental and light drinking by youth be distinguished from regular and heavy teenage alcohol use so that the relationship between different drinking patterns and the prevalence of negative outcomes can be more clearly established (e.g., Dielman 1994; Donovan and Jessor 1983; Sarvela and McClendon 1987b). Unfortunately, the current definition of the AOD problem has deflected attention of researchers and prevention planners away from identifying how variations in youth alcohol consumption are related to specific problems that youth experience. Similarly, the identification of factors other than drinking causally implicated in these problems has been neglected. This has encouraged generalized approaches to AOD use prevention rather than initiatives carefully targeted to reducing specific problems.

Common Risk Factors Lead to All Forms of Youthful AOD Use.

Definition of the problem as any AOD use by youth has been accompanied by widespread acceptance of the proposition that common risk factors lead to all forms of substance use behavior. This assumption also promotes generalized approaches to the prevention of youthful drinking and other drug use behaviors.

Nevertheless, no risk factor has been definitively identified as a common cause of AOD use by children and adolescents. To the contrary, research indicates that not every risk factor is correlated with every type of substance use. Moreover, risk factors change with age and development, exposure to risk factors varies, complex interactions between risk factors and other variables influence youthful drinking, risk factor indices do not explain a large portion of the variance in youthful alcohol use, and even among children exposed to potent risk factors, it is unusual for more than half to develop serious disabilities or persistent disorders (Boyd et al. 1994; Donnermeyer and Huang 1991; Engstrom 1984; Kumpfer 1989; Lorion et al. 1991; Moncher et al. 1990; NIAAA 1994a; Newcomb et al. 1986; Shedler and Block 1990; Werner 1990).

Causal relationships between risk factors and alcohol consumption are poorly understood, and experts have now concluded that no single etiological pathway is likely to explain and predict youthful drinking behavior (Boyd et al. 1994). Additionally, as Shedler and Block (1990) have demonstrated through longitudinal research, phenomena currently identified as risk factors may be symptoms, not causes, of the problems actually responsible for teenage substance abuse. Finding that such problems can be traced to the earliest years of childhood, these investigators suggested that current drug prevention efforts are misguided to the extent that they do not focus on the underlying issues of personal and social maladjustment.

The assumption that the same risk factors predict all forms of substance use by youth ignores differences in the place that alcohol and other drugs occupy in American society. Alcoholic beverages are heavily advertised, readily available in commercial establishments, legally sold to adults, and widely used in many social settings. Both young people and adults use alcohol at a higher rate than other drugs. In 1992, for example, among rural youth ages 12 to 17, the 30-day use prevalence rate for alcohol was 15.7 percent compared to 6.1 percent for any illicit drug; if marijuana is excluded, the latter figure drops to 3.2 percent (SAMHSA 1993b). Differential availability, regulation, and consumption of alcohol and other drugs in the social environment logically should be related to differences in risk factors for youthful drinking and other substance use. At a minimum, peer and parental modeling of alcohol use is much more common than the modeling of other drug use behaviors.

AOD Use Is an Urban Problem. Since AOD use has been characterized as an urban problem, surveillance of substance use by rural youth has been slighted. Although national surveys collect data on alcohol use prevalence among nonmetropolitan adolescents, samples are not designed to identify rural regions and communities with the highest rates of drinking or alcohol-related problems. Without this information, policymakers do not have a solid basis for estimating the need for alcohol use prevention in rural areas, administrators cannot distribute resources where they are likely to have greatest impact, and planners do not have data needed to tailor prevention programs to patterns of youthful alcohol use in their service areas.

Funds for prevention therefore have been sprinkled throughout rural school districts, promoting the assumption that the AOD use problem is pervasive. The location of Federal demonstration projects has been

determined by ability to write a winning grant application. Even when these applications are based on local needs assessments, the proportion of all rural youth at risk who are reached by these efforts cannot be estimated because the denominator is missing.

Program Design and Implementation

Since the definition of a problem shapes its solution, assumptions about youthful AOD use have fundamentally influenced the design of rural alcohol use prevention programs. In addition to directly affecting decisions about goals, methods, and target groups, these assumptions have limited the data available for prevention planning, hindered critical analysis of the issues, and led to preventive approaches inadequately adapted to rural characteristics.

Unrealistic Goals. The goals of AOD prevention have been criticized as much too broad to focus program efforts and assess preventive effects (Dielman 1994; Thompson et al. 1984). Since youthful drinking has proven very difficult to prevent (e.g., Moskowitz 1989; Rundall and Bruvold 1988), the feasibility of attempting to eradicate alcohol use by youth also has been widely questioned. Thombs and colleagues (1994) observed that such a goal neglects the real goals of adolescents (e.g., fun, excitement, and social facilitation), but instead focuses on preventing the means (alcohol use) through which youth seek goal achievement. Several analysts have cautioned that sustained reductions in youthful drinking may not be achievable without major societal changes in alcohol consumption (Benard et al. 1987; Ellickson and Bell 1990; Ellickson et al. 1993; Moskowitz 1989; Thompson et al. 1984). Others have observed that adolescent experimentation with drinking may be normative, developmentally appropriate behavior in the United States (Jessor and Jessor 1975; Martin and Pritchard 1991; Newcomb and Bentler 1988; Perry 1986; Shedler and Block 1990).

Unproven Prevention Strategies. Reflecting CSAP recommendations, most rural prevention programs attempt to reduce at least two risk factors, as well as to increase protective factors affecting youthful AOD use. Local program organizers determine which risk factors are most important in their schools and communities and how to effect risk factor reduction. Rural prevention planning therefore is based upon the assumptions that the risk factors selected for reduction are important causes of drinking and other drug use by rural youth, these risk factors

can be changed by the methods designated, and reducing these risk factors will prevent AOD use by the population targeted.

As already pointed out, risk factors for youthful AOD use are not clearly identified. Moreover, many programs do not use the data now available in selecting risk factors to target. Hansen (1992, 1993) found that of 12 common prevention strategies linked to risk factors, only 4 are strong correlates of teenage drinking: belief that alcohol use is acceptable among youth, low personal commitment to abstain from alcohol use, belief that alcohol use fits with personal values, and lack of awareness of the consequences of alcohol use.

Even if future research should confirm that some currently identified risk factors are causally implicated in youthful AOD use, little is known about effective ways to reduce them. Prevention approaches that increase the personal and social competencies of youth appear promising (Goplerud 1991), but as Kumpfer (1990) has observed, it is unrealistic to expect that a few hours of classroom instruction can develop all of the affective and interpersonal skills needed by youth with multiple deficiencies in coping.

To date, successes in increasing the skills of youth have been demonstrated only in programs systematically implementing carefully developed prevention methods, usually over a period of several years (e.g., Botvin et al. 1995). The literature suggests that, except for a few schools and communities participating in university-sponsored research projects, such programs have not been conducted in rural areas. Although the GAO (1992*b*) found that rural schools teach such skills as decisionmaking, information about the nature, duration, and effectiveness of such instruction was not provided. A traditional (instead of an interactive) teaching style (Ennett et al. 1994; Tobler 1992) and limited program exposure (Benard et al. 1987; Goodstadt 1986; Kumpfer 1990) can fail to produce skill improvement, even if program content is relevant.

Research on the reduction of other risk factors is in its infancy. Whether, for example, parental involvement in AOD prevention programs can alter dysfunctional patterns of parenting is an empirical question that to date has received little research attention. Because data on the modification of risk factors is scarce, almost nothing is known about whether such change reduces youthful substance use. This may not be the case. For example, if risk factors initiate processes leading to AOD use,

modifying these risk factors after processes have been set in motion may have little effect on young people's AOD use behavior.

Despite gaps in research knowledge, program developers and prevention practitioners must do what they can to make pragmatic sense of available information. CSAP and other agencies therefore have encouraged schools and communities to adopt those approaches that promise to be most feasible and effective in their unique situations. Little is known about how rural prevention programs have been planned or the considerations that have motivated specific planning decisions, but program descriptions in the literature clearly indicate that assumptions about youthful AOD use have been influential.

This development has been promoted by intense publicity about youthful AOD use, CSAP criteria for prevention program support, guidelines to facilitate local planning (e.g., Bennett 1986; Melear 1990; Rhodes and Jason 1988), bulk distributions of free materials, skillful commercial marketing of untested prevention packages (Hansen 1992; Kumpfer 1990), and the advice of experts themselves convinced by the prevailing AOD use litany. Combined with the newness of the school-based prevention field and the eagerness of practitioners to try promising approaches, these forces have produced what Kumpfer (1990, p. 110) has termed "a single variety bandwagon phenomenon." Due to resource scarcity and professional isolation, rural schools and communities may have been especially prone to unquestioning adoption of the risk factor approach to AOD use prevention.

Another probable reason for the popularity of the risk factor model in rural areas is that almost any activity can be justified within this generic framework. Adoption of the risk factor model as the basis for program development therefore represents only a cosmetic advance over advice provided at the first National Conference on Drug and Alcohol Abuse Prevention sponsored by NIDA and NIAAA: attendees were told that they need not test educational programs and curriculums directed at preventing drug abuse, but that instead they should design programs that "feel right" (Engs and Fors 1988).

With such freedom, rural schools and communities can use funds for AOD prevention to support projects of untested value or to address a spectrum of youth needs not central to substance use prevention. The dictum that multiple risk factors should be targeted in prevention programs further encourages broad planning. Helge (1990) and Laws

(1991) thus have advised rural schools and communities to develop holistic prevention approaches that address the emotional, physical, academic, and social needs of students and that involve families in program planning and implementation.

Age Groups Targeted. Because behavior is theoretically easier to prevent before it is initiated, AOD prevention efforts in schools and communities have been concentrated on young people who have not yet started to drink or are in the initial stages of experimentation (Hansen 1993). Based on research findings that substantial numbers of youth begin drinking during early adolescence, most prevention programs to date have targeted youth in transition from elementary to middle or junior high school. However, failures to prevent alcohol use in this age group coupled with data showing decreases in age of first drinking have led to recommendations that prevention efforts be directed to younger and younger children (Binion et al. 1988; Gibbons et al. 1986a; Goplerud 1991; Laws 1991; Sarvela and McClendon 1987b, 1988; Schaps and Battistich 1991).

Promoting abstinence from drinking in very young children may not be a wise use of AOD prevention resources. Motivations to drink change as development progresses (Gordon and McAlister 1982; NIAAA 1994a), and pledges made in childhood therefore lose their meaning in the adolescent years. For this reason, some drug prevention programs for young children are generic in nature and have a number of broad developmental goals (Gardner et al. 1994; Schaps and Battistich 1991).

Some preliminary evidence indicates that early intervention to increase children's self-esteem, social competence, and bonding with social institutions does have positive outcomes (Schaps and Battistich 1991). Fostering the healthy development of children is a worthy goal, but this is a general aim of education, as well as of many health and social programs. Justifying and pursuing this broad goal solely in the name of AOD use prevention therefore potentially trivializes its far-reaching importance. In addition, this narrow approach may foster dependence on drug prevention resources to support education that should be incorporated in all parts of the school curriculum and in community-based programs for children and adolescents.

Youth who already have started to drink have been deemed inappropriate targets for primary prevention efforts. Although data show that young people initiate drinking throughout adolescence, no primary prevention

efforts directed to older youth and young adults were discovered in the literature. Some rural prevention projects include case-finding and treatment of adolescents experiencing problems related to AOD use. Consistent with the current definition of the problem and terminology in the chemical dependency field, these project components are commonly called "interventions." Less often, they are viewed from a public health frame of reference and termed secondary "prevention."

Current approaches to AOD use prevention thus neglect adolescents who have not yet initiated drinking or who have done so only experimentally. Most youth in this age group are involved in AOD programs only when their drinking has been identified as a problem. This situation reflects the practice of targeting prevention programs to young people in particular age groups without recognizing within-group behavioral heterogeneity. Since the proportion of students who have tried alcohol increases with age, primary prevention programs are typically developed only for age groups known to have a low prevalence of ever using alcohol. These groups are treated as if all members have never tasted alcohol or tried an experimental drink (Goodstadt 1986). Youngsters who have used alcohol thus may feel excluded from these programs or regard them as irrelevant.

Problems in Implementation. The design of prevention programs should consider not only what strategies are likely to be effective in reducing a problem but also whether these approaches are feasible in a particular setting and what supports are needed to translate plans into practice (Goplerud 1991). Successful implementation of a prevention program involves several stages that depend heavily upon internal project organization, as well as many other factors. Monitoring is recommended as the program is delivered to ensure that adaptations do not compromise elements deemed essential to the achievement of prevention objectives and that adjustments are made as required (Price and Lorion 1989). Little is known about these aspects of alcohol use prevention in rural areas, but the ways in which particular strategies are implemented can be expected to vary with differences in program leadership, school and community characteristics, and resource availability.

Barriers to rural prevention efforts have not been systematically studied, but some obstacles have been identified. Entrenched poverty, geographic and subcultural isolation, wide dispersion of the population, poor or absent public transportation, and extremely limited public resources

constrain what can be done by both schools and communities (Murray and Keller 1991; OSAP 1991; Youth Health Services 1994). Also, rural youth are much more mobile than expected, making continuity of involvement in prevention programs difficult (Youth Health Service 1994).

Additional issues affecting school-based prevention programs include stressed public school systems, unqualified staff and high staff turnover, insufficient teacher training, limitations in available space, competing needs, and a 200-day school calendar (Benard et al. 1987; Youth Health Service 1994). Community-based prevention efforts are hindered by low awareness or denial that youthful AOD use is a problem, emphasis upon treatment instead of prevention, lack of accessible and affordable youth services, and agency competition for scarce public funds. Further, rural parents and youth may not participate in large formal organizations because they are accustomed to small, informal family, church, and neighborhood groups (Youth Health Service 1994).

Program Evaluation

As the preceding review indicates, very few programs aimed at preventing alcohol and other drug use by rural youth have been evaluated. Results from this small group of studies indicate that program effects on youthful alcohol use have been modest at best. Although more impressive outcomes have been reported for some programs (e.g., Kneidek 1989), inadequate data are provided to support these claims. The evaluation of Project Northland now in progress (Perry et al. 1993) promises to yield important information about alcohol prevention in rural communities, but at present, little is known about the effectiveness of rural prevention efforts.

Many factors have been identified as impediments to evaluation of AOD prevention programs, and these difficulties may be exacerbated in rural areas. Some evaluation challenges are related to program design (e.g., lack of clear objectives and priorities, program complexity, and modifications in objectives, content, and methods as the program is implemented or evolves over time) (Swisher 1990). Timing of outcome evaluation also may be an issue if the program has been in operation too briefly for effects to be observed or if inadequate thought has been given to when effects should become apparent.

Most controversy, however, concerns evaluation methodology. Evaluation experts have identified numerous methodological flaws that compromise

assessment of whether prevention efforts reduce youthful AOD use. These technical problems include small samples and inadequate statistical power to detect program effects; biased sample selection; lack of appropriate control or comparison groups; control group contamination; questionable validity and reliability of measures; use of dependent variables such as knowledge and attitudes that are not clearly linked to behavior; reliance on self-report data; lack of pretest, posttest, or long-term followup measures; failure to distinguish between process and outcome evaluations; failure to evaluate program implementation; nonstandardized data-collection techniques; no triangulation of data sources; high attrition rates; inappropriate statistical analyses; failure to examine differential prevention effects on various subgroups; and failure to consider external threats to validity (Bruvold and Rundall 1988; Dielman 1994; Goodstadt 1986; Hansen 1993; Kumpfer 1990; Moskowitz 1989; NIAAA 1994a; Tobler 1986).

Some prevention experts consider these criticisms overzealous and counterproductive. Hansen (1993) has observed that the "critical reviewer bias" emphasizes the weaknesses of research to the exclusion of promising alternatives and thus prevents the field from advancing. Asserting that most evaluations of AOD prevention programs report some positive results, Swisher (1990) has chided reviewers of evaluation studies for their limited scope; for ignoring beneficial changes in areas such as delinquency, school dropouts, and discipline; and for highlighting methodological flaws that undermine positive findings. Pointing out that the real purpose of evaluation is to improve programs, but that evaluation often serves only as a means of accepting or rejecting them, Swisher has recommended building on positive results and modifying from that stance until the most effective strategies evolve. These analysts and others (e.g., Klitzner 1993; NIAAA 1994a) have emphasized that prevention programs are difficult to evaluate and methodological compromises are necessitated by work in real-world settings.

Comments by those involved in the delivery of rural AOD prevention programs underscore these points. In some cases, obtaining the cooperation of program sponsors and staff with evaluation has been difficult. Project staff may not agree that evaluation is important in a demonstration project and they may be suspicious about its purpose. Rural schools and communities often lack access to evaluation experts, and, even when they are available, local leaders may insist on proceeding without their advice. When such advice is obtained, those responsible for rural programs may refuse to assign any individuals to nonintervention

conditions or otherwise to work within the parameters of controlled studies. They also may experience difficulty in developing culturally appropriate evaluation measures, in reconciling sample size requirements with the reality of small populations, and in developing and implementing data-collection and management systems. Restrictions on the percentage of CSAP funds that can be used for evaluation and changes in CSAP evaluation requirements have imposed additional problems (Griffin 1986; Lorion et al. 1992; Rhodes and Jason 1988; Youth Health Service 1994).

In combination, these issues have resulted in an evaluation impasse. Recommendations for improved evaluation of AOD prevention programs are laced throughout the literature spanning two decades, yet little progress has been made. In part this situation reflects the difficulty of designing evaluations that meet rigorous methodological standards but that also respect programmatic and resource constraints. However, at another level, this stalemate appears to result from and contribute to the current definition of the AOD use problem. Data from program evaluations, as well as from research, challenge the social construction of reality and thus are incompatible with ideological approaches to prevention.

CONCLUSIONS AND RECOMMENDATIONS

The scientific basis for preventing alcohol use by rural youth needs to be strengthened. However, because current thinking about youthful AOD use appears to be a product of socially constructed beliefs, simply conducting more research and evaluation studies within the same paradigm is unlikely to produce breakthroughs in knowledge. As Humphreys and Rappaport (1993) have observed:

... [T]he number of research projects being done on substance abuse at this time is unprecedented. Much of this research conforms to the dominant political tone of the times by accepting the claims that have been made about the social problem of substance abuse ... and thus [perpetuates] the status quo (p. 887).

The recommendations that follow identify policies and research to stimulate and support fresh analyses of alcohol use by rural youth and the development and testing of related prevention approaches in rural communities and regions. In that these proposals build on and, in some

cases, repeat the recommendations of investigators and policy analysts cited throughout this chapter, they are consistent with other appraisals of important directions for advancing prevention science. However, they are unique in three respects. First, they frankly challenge current AOD use ideology. Second, they recognize that rural heterogeneity offers an exceptional opportunity to study social factors affecting alcohol use by children, adolescents, and young adults. Third, they acknowledge that both the scarcity of rural resources and the extent to which alcohol use is integrated into the social fabric require increased collaboration with other disciplines and sectors in rural research and prevention programs. Efforts to prevent alcohol use by rural youth therefore can contribute to and benefit from larger initiatives aimed at understanding and revitalizing rural America.

Develop New Partnerships for Research on Alcohol Use by Rural Youth

Concern about the social and economic plight of rural America has stimulated discussion of research and policy initiatives in many sectors. Some of these proposals are relevant to understanding and preventing alcohol use by rural youth, but to date this has not been adequately recognized.

For example, in 1987 a national conference was held to develop a congressionally mandated agenda for health services research in rural areas (McManus and Newacheck 1989; Patton 1989). A number of the issues raised, particularly concerning maternal, child, and adolescent health, are relevant to alcohol use prevention, but this was not noted. Efforts to direct attention to mental health needs of rural America cited OSAP activities (Human and Wasem 1991; Murray and Keller 1991), but did not acknowledge that research on youthful alcohol use is germane to understanding the effects of rural conditions on mental health. Similarly, in identifying research needed to illuminate the role of the family and poverty in the educational attainment of rural youth (Lichter et al. 1993), the importance of studying youthful alcohol use was overlooked.

Another largely unexplored opportunity rests in the fact that in 1992 the Office of Juvenile Justice and Delinquency Prevention (OJJDP) was authorized to support research, training, and program efforts in a number of new priority program areas, including delinquency prevention and treatment in rural areas (OJJDP 1993). Other opportunities for partnerships

are defined by widespread interest in the health of America's youth (e.g., Elster et al. 1993). In a comprehensive report on this subject, the Congressional Office of Technology Assessment recognized the need for research examining the relative influence of rural, regional, social class, and ethnic characteristics on the health and well-being of adolescents (U.S. Congress 1991).

Although efforts to prevent alcohol use by rural youth are not yet strongly coordinated with other rural and youth initiatives, the need for broad-based national, State, and local collaboration in rural research and problem-solving is widely recognized (Elliott 1988; Helge 1990; Human and Wasem 1991; Laws 1991; Mick et al. 1993; Murray and Keller 1991, OJJDP 1993; Patton 1989). Discussions of alcohol use prevention programs for Native Americans additionally have emphasized an important principle applicable to all rural populations: People should be active participants in developing, implementing, and evaluating initiatives that affect them (Blum et al. 1992; LeMaster and Connell 1994; May 1986).

These findings support the following recommendations:

- At national, State, and local levels, agencies and investigators concerned with preventing alcohol use by rural youth should interact with agencies and groups concerned with other rural issues and with the health of America's youth in order to identify mutual interests and develop collaborative approaches.
- Legislation supporting rural research and development should encourage multisectorial, multidisciplinary collaboration.
- The Federal Government should provide leadership in fostering collaboration and development of a National perspective on rural issues by providing mechanisms for states and rural communities to share issues, data, and problemsolving, as Murray and Keller (1991) suggested.

Develop Standardized Measures

Understanding alcohol use by rural youth requires more precisely defining both "alcohol use" and "rural." Standardized definitions are needed so data can be compared across time, settings, and populations.

Developing an empirical typology of youthful alcohol use would advance both research and prevention planning by making it possible to identify how specific drinking behaviors are related to particular consequences in various age and gender groups, communities, and cultures (Kilty 1990; Thompson 1989). At a minimum, youthful alcohol use needs to be assessed separately from the use of other drugs (U.S. Congress 1991) and measures of "ever use" should have lower priority than assessments of current drinking. While annual, 30-day, 7-day, and daily use prevalence rates help to monitor trends, experimental drinkers should be distinguished from regular users in analyses of data from research and program evaluations. Dielman (1994) also recommends distinguishing children who use alcohol only under adult supervision from those who drink unsupervised. Information on age of drinking initiation, frequency and quantity of alcohol consumption, and drinking situations (occasion, place, time, day, and season) is needed to understand patterns of drinking by rural youth in different communities and at different ages. Standardized, age-appropriate measures of alcohol effects (e.g., being drunk) and of problems resulting from alcohol use also are needed.

The meaning of rural should be better defined so that youthful drinking rates and the prevalence of alcohol-related problems can be compared by type of rural community (Kelleher et al. 1992; Swaim et al. 1986). Difficulties resulting from inconsistent definitions of "rural" have long been recognized by Federal agencies concerned with data collection and rural issues, but earlier attempts to develop a common typology of rural areas have not succeeded. A resurgence of interest in rural health care delivery has generated new proposals for revising definitions (Braden and Beauregard 1994; Cohen et al. 1993; McManus and Newacheck 1989; Patton 1989). This activity, current efforts to streamline Federal data-collection systems, and multisectorial interest in developing compatible databases mark this as an opportune time for pursuing a more adequate typology of rural areas, specifically as noted below.

- Agencies that fund research and program evaluations concerning alcohol use by rural youth should require that current alcohol use be measured, that experimental and regular drinking be measured separately, distinguished, and that alcohol consumption be distinguished from other forms of substance use.
- The NIAAA should convene a working group to develop recommended measures of youthful alcohol use and its effects. Draft

measures should be refined through systematic field testing with youth of differing ages and cultural backgrounds in rural and urban communities. These measures should then be adopted as standards by agencies funding alcohol research and evaluation studies.

- NIAAA, NIDA, CSAP, and other Federal agencies concerned with alcohol use by rural youth should explore ways to support the development of a common system for classifying rural communities. Until such a framework is developed, these agencies, investigators, and prevention specialists should use the typology developed by the National Rural Health Association (1993).⁴

Identify the Problems To Be Prevented

From a public health perspective, behavior is a concern only when it signifies the existence of a problem or itself leads to negative health and social consequences. More precisely identifying the prevalence, severity, and distribution of problems associated with alcohol consumption by rural youth is therefore critical in determining priorities for research and in assuring that important needs are addressed by prevention initiatives. Because the nature and magnitude of alcohol-related problems may differ in different rural communities or regions (Mick et al. 1993), research in diverse rural communities and community comparisons are essential. The following four examples illustrate specific types of research needed.

Rural Problem Clearly Related to Youthful Alcohol Use. Alcohol-related traffic crashes are the leading cause of death and spinal cord injury for youth ages 15 to 24 (DHHS 1991). Recent progress in reducing this cause of death has been least apparent among persons 21 to 24 years of age, and in 1993 this age group recorded the highest intoxication rates (30.7 percent) in fatal crashes (NIAAA 1994a; NHTSA 1993a). Because as many as two-thirds of all U.S. motor vehicle deaths occur in rural areas (National Safety Council 1988), research is needed to illuminate the conditions associated with crashes involving rural youth and young adults. Particular attention should be devoted to determining whether alcohol-related motor vehicle crash rates in rural areas mirror age and gender differences observed nationally (Fell 1987; NHTSA 1993a; Popkin 1991; Zador 1991), and, if so, to explaining the dramatic differences between rates for youth ages 16 to 20 and those 21 to 24 years of age.

Rural Problem Documented but Relationship to Youth Alcohol Use Unknown. The rapidly increasing incidence of AIDS in rural areas (Berry 1993), high rates of human immunodeficiency virus (HIV) infection among youth from the rural Southeast (Durant et al. 1992; St. Louis et al. 1991; Young 1992), and low levels of knowledge and attitudes that protect against HIV among rural adolescents (Boswell et al. 1992; Durant et al. 1992) signal the importance of determining whether rural youth who drink are at increased risk of unsafe sexual practices. Although research on the relationship between alcohol use and sexual activity is in its infancy (NIAAA 1994a), some studies have shown that the risk of early sexual intercourse increases with level of alcohol involvement (e.g., Kandel 1990) and that some teenagers are less likely to use condoms in sexual encounters that immediately follow drinking (Hingson et al. 1990; Strunin and Hingson 1992). Such behavior increases risk not only for HIV infection, but also for other sexually transmitted diseases and unwanted pregnancy.

Alcohol Use Known To Increase Risk but Rural Problem Not Documented. Although studies have shown that alcohol use during pregnancy presents considerable risk both to the mother and the fetus (Funkhouser et al. 1992), no studies were found concerning alcohol use by rural pregnant teenagers. This is an important research gap, for 22.7 percent of nonmetropolitan women compared to 16.5 percent of metropolitan women bear their first child by age 18 (Lichter et al. 1993). That alcohol use during pregnancy may be a problem is suggested by research on drinking by teenage parents: 48 percent of rural girls who gave birth before age 18 used alcohol, while the drinking rate for those who gave birth between ages 19 and 21 was 60 percent (Elster et al. 1990).

Rural Problem Not Documented and Relation to Youth Alcohol Use Unknown. Pointing out that the highest rate of homicide for children ages 10 through 14 is in New Mexico, not Washington, DC, Johnson (1993) expressed concern that a national forum on violence failed to acknowledge the need for violence-prevention efforts in rural areas. However, the prevalence of youth violence has not been documented in rural communities and the relationship of violent behavior to alcohol use is not well understood (NIAAA 1994a). Although alcohol use is rarely the sole cause of violent behavior and the majority of drinkers, even heavy drinkers, never engage in violence (NIAAA 1994a), alcohol use by adults, especially young males, appears to be involved in a high proportion of sexual and nonsexual assaults, gun fights, homicides, suicides, and robberies (Collins and Messerschmidt 1993). Because data

on alcohol use and violence among noninstitutionalized adolescents are generally scarce (White et al. 1993), studying this issue in rural environments would advance understanding about a problem of national concern. Moreover, without data, rural needs may be neglected.

The following recommendations can be made:

- Research should be conducted to establish the prevalence and distribution of problems related to alcohol use by youth in rural communities and regions.
- Health objectives for the nation should accord high priority to the prevention of alcohol-related motor vehicle crashes involving rural adolescents and young adults.⁵

Study the Epidemiology, Etiology, and Ecology of Problem Occurrence

Designing effective prevention approaches requires understanding how a problem develops, identifying the key causes of trouble, and determining where the destructive chain of events can best be interrupted. Because the causes of youthful alcohol use and alcohol-related problems are extremely complex and intertwined and because multiple etiologies may be involved, the research task can seem overwhelming. However, because of their number, size, and heterogeneity, rural communities are uniquely suited to research on how patterns of youthful drinking interact with other factors to cause alcohol-related problems.

Both patterns of alcohol use and problem occurrence vary with age, gender, and race/ethnicity; these variables thus should be considered in research design and data analysis. Selecting other variables for study from the myriad potential influences on youthful drinking and the development of alcohol-related problems requires thoughtful consideration. Possible selection criteria include observations, analyses, hypotheses, or theoretical models indicating a variable is important; a lack of previous research testing the proposed relationship or inconclusive results from previous studies; and potential to modify the variable through preventive intervention.

The new knowledge to be gained from repeated study of established relationships should be carefully assessed; however, some replications are needed to determine whether the factors associated with a problem in

urban areas or particular rural settings are important across rural populations and communities. Because factors related to youthful drinking and its consequences may differ in different populations, the generalizability of research conducted in particular settings cannot be assumed (Kelleher et al. 1992; May 1989; Napier et al. 1981; NIAAA 1994a). For this reason, rural communities should be studied independently, but with methods and measures that permit cross-community comparisons.

Determine Patterns of Youthful Drinking Related to Problem Occurrence. Specific patterns of youthful alcohol use associated with specific negative outcomes in rural areas should be identified. These patterns may be distinguished both by studying drinking behaviors related to particular problems and by assessing the number and types of problems experienced by youth who differ in frequency and amount of alcohol consumption. Identifying consequences of heavy drinking among rural adolescent males and young adults should be a high priority, as should the study of alcohol use and alcohol-related problems among rural school dropouts.

Limited rural data and studies in urban areas suggest that fewer than 20 percent of youth who drink experience multiple health and social problems. These youth appear to exhibit problem behaviors at an early age before drinking is initiated (Shedler and Block 1990); however, they also may be among the first in their peer group to experiment with alcohol use, and the frequency and amount of their alcohol consumption may increase as development progresses. On the other hand, Dielman (1994) has demonstrated that by grade six about 80 percent of youngsters have no experience or only supervised experience with alcohol, and that these youth are unlikely to become involved in alcohol misuse in later grades. Research is needed to determine whether these findings apply to rural youth. Studies also are needed to assess whether experimental, light, and moderate drinking by rural youth results in trouble, and if so, to identify the nature and frequency of negative events.

More attention to transitions in the drinking behavior of rural youth and the time lags involved could provide important information for the design of prevention programs. For instance, youngsters who move quickly from the first taste of alcohol to unsupervised experimental drinking and then to regular drinking may be at greater risk for alcohol abuse and alcohol-related problems than youth who initiate regular drinking more gradually.

Study Individual, Family, and Peer Influences on Youthful Alcohol Use and Alcohol-Related Problems. Shedler and Block (1990) have identified the psychological triad of alienation, impulsivity, and distress as a distinct personality syndrome related to frequent adolescent drug use, with poor quality of maternal parenting as a key causal factor. Although these investigators studied urban youth, the Iowa Youth and Families Project also found a relationship between parenting difficulties and anti-social behaviors of rural adolescents, including alcohol use by seventh graders (Conger et al. 1991; Conger and Elder 1994). These personality traits and family factors merit further investigation in studies of rural youth.

Peer influences on drinking by rural youth also should be studied further. Although many dimensions of peer relationships have been correlated with youth alcohol use, the dynamics of peer influence on drinking are still poorly understood. Examining the characteristics of youth involved in different types of peer groups and the participation of these groups in various drinking activities may provide critical clues for prevention. Additional research on the role of older youth in initiating young teenagers to drinking and in supplying them with alcohol is very important (Wagenaar et al. 1993), for this is potent socialization.

Binion and colleagues (1988) have advised that alcohol use prevention programs need to take into account the complexity and interrelatedness of the user's rationales. Steinberg's (1991) recommendation that young people be differentiated by whether they use substances in response to stress or to the social mores of their age group thus appears highly relevant to research on alcohol use by rural youth. Moreover, as Thombs and associates (1994) have shown, identifying motivational and situational variables related to teenage drinking can help to distinguish subgroups of rural youth at risk for different types of negative outcomes. The preceding literature review suggests that the desire to have fun with peers and to relieve boredom may be powerful motives for youthful alcohol use in rural areas. Further study of the situations in which rural youth drink, their expectancies related to alcohol consumption, and their own explanations for drinking promises to be fruitful.

Additional research on ways that rural youth use their time also is likely to be productive (Gibbons et al. 1986b). Alexander and colleagues (1992) have pointed out the importance of studying frequent cruising in cars and trucks and multiple types of risk-taking behavior, noting that such activities are related both to substance use and the risk of teenage

injuries. Rural youth have a higher rate of accidental injuries than their urban counterparts (U.S. Congress 1991), and rural youth who work are at increased risk of injuries (Alexander et al. 1992), but research is needed to determine whether youthful alcohol use is implicated in these relationships. Similarly, research should be conducted on the relationship between alcohol use by young people in rural areas and the time that they spend on school work, their educational achievement and aspirations, and the extent to which they believe they can control their future.

Identify Socioenvironmental Factors Related to Youthful Drinking and Problem Occurrence. Rural communities offer a unique opportunity to study relationships between youthful alcohol use and individual, peer, and family variables in the larger social context. Perry and associates (1993) are setting the pace by surveying students, parents, merchants, and community leaders in order to compare normative expectations about underage drinking, as well as to guide the design and evaluation of Project Northland prevention strategies. Additional research should determine whether the values expressed in such surveys are consistent with informal interactions concerning the acceptability and tolerance of drinking by rural youth. Relationships between attitudes toward youth alcohol use and adult drinking practices also should be studied. Because these variables are major sources of social influence, investigating their relationship to the drinking practices of rural youth will help to advance both theory and the design of rural prevention programs.

Further research is needed to identify community characteristics associated with variations in youthful drinking practices. Kumpfer (1989) has cited unpublished research by Coate and Grossman suggesting that a community's "drinking sentiment" and religious composition are major determinants of alcohol consumption. As local norms and values also are expressed in the availability of alcohol to youth and in the adoption and enforcement of laws and policies to control youthful drinking (Funkhouser et al. 1992), these variables, too, should be studied in rural communities and compared to the alcohol-related attitudes and behaviors of young people, their parents, and other adults who live there. The packaging, pricing, and advertising of alcoholic beverages in rural communities, as well as the geographic distance to outlets where alcohol is sold to minors, also may reflect local norms (Lorion et al. 1991), but the extent to which these variables are controlled by external groups needs to be determined.

Moskowitz (1989) and Kumpfer (1989) have observed that each community has its own informal social control system that generates normative influences pertaining to drinking and drinking-related behaviors. They have proposed that formal controls are needed only when these "cultural recipes" break down, but that even then, the effectiveness of policies and regulations depends on congruence with informal controls and adequate communication. These concepts suggest important directions for research in rural areas. To identify potential points for intervention, etiological studies are needed to ascertain what natural mechanisms control drinking behaviors by youth in different physical and social settings, as well as to determine why these mechanisms deteriorate (Moskowitz 1989).

Studying differences in the social organization of rural communities may be critical in understanding normative influences on youthful alcohol use as well as community capacity to mount prevention programs. Degree of community integration is likely to be a key factor in determining whether subgroups of youth are subject to different social influences. Rural communities are not necessarily cooperative and homogeneous, for socioeconomic differences can separate business and farm owners from laborers, oldtimers may not welcome newcomers, and former disagreements can be a source of ongoing animosity. Prejudice and discrimination can thrive. Resulting social distinctions may be related to subgroup differences in youthful drinking, and indeed, different patterns of drinking may socially symbolize subgroup membership (Douglas 1987). Important questions for research therefore are whether patterns of alcohol use by rural youth vary with characteristics of community subgroups, subgroup identification, and the relationships of subgroups to each other. Another significant research issue is how the social organization of rural communities affects support for and collaboration in efforts to prevent youthful drinking.

Many other ecologic variables may be related to youthful alcohol use and the occurrence of alcohol-related problems. Relationships therefore should be explored between these variables and community size, population density, and U.S. region; the distribution of the population by age, education, income, and race/ethnicity; attributes of schools, government agencies, community services, and business; employment rates; occupational structure; job opportunities for youth; distance from an urban center; and topographic features, especially as these affect face-to-face interactions, transportation, and electronic communication. The profound changes affecting many rural communities should be studied as natural,

if harsh, experiments (Howard et al. 1994; Kumpfer 1989) to test the effects of macro forces such as in- and out-migration, shifting economic conditions, and increasing ties to urban centers on youthful alcohol use and the sequelae of underage drinking.

Multiple Contributing Factors. Factors other than youth alcohol use potentially contributing to a problem should not be overlooked. Multidisciplinary involvement in problem analysis can help to avoid a narrow focus on drinking as the sole causal factor. Briefly examining elements that may be involved in alcohol-related motor vehicle crashes involving rural youth illustrates that prevention may need to address a broad range of issues.

Findings that binge drinking and heavy drinking are more common among rural than urban youth (Johnston et al. 1993, 1994; SAMHSA 1993b, 1994) probably translate into the rural culture of Saturday night in town—or at the lake, the roadhouse, or simply off in the fields or the woods with a bunch of friends and a supply of beer. Regardless of the site for heavy drinking, the return home places youth at extremely high risk for motor vehicle crashes. Young males are less likely than other drivers to wear seatbelts at night, and seatbelt use also appears less common in nonmetropolitan areas (Foss et al. 1994). The risk of a crash increases with the number of miles driven (DHHS 1991), yet distance is a basic fact of rural life.

Moreover, rural roads invite speeding, a fundamental factor in the physical forces involved in crashes (McCarthy 1993; DHHS 1991). Teenage traffic deaths increased sharply in States that raised rural interstate highway speed limits (Baum et al. 1990). However, in Indiana, these higher speed limits diverted traffic so that increased traffic fatalities occurred on country roads (McCarthy 1993). At night, sparsely traveled roads that cut through wide-open spaces can inspire alcohol-induced games of "chicken." Other hazards are presented by roads that wind through mountains, around bodies of water, and over narrow bridges. Poor road maintenance and lack of guardrails add to the danger (Baker et al. 1987), as do animal crossings. A horse or a deer can leap onto the road so suddenly that even an unimpaired driver traveling at a reasonable speed is at risk of collision. The potential for tragedy is heightened when a drinking youthful driver is operating an old vehicle with worn tires and brakes or when friends are loaded into the open bed of a truck or pickup.

When a crash occurs, help may be a long time coming and neither transportation to the nearest hospital nor staff available there may be sufficient to provide proper emergency care to all victims. Solo country doctors tell horror stories about trying to assist six or seven teenagers injured on rural roads in weekend motor vehicle crashes. However, these communities at least have medical care. In 1990, 126 U.S. communities of fewer than 50,000 people had no doctor at all (Weisfeld 1993).

Research is needed to explain the finding that alcohol involvement in nonoccupant (pedestrian) fatal crashes is higher in rural than urban areas (Centers for Disease Control and Prevention (CDC) 1994; NHTSA 1993b). Because most of these fatalities happen on major streets or highways with posted speed limits of 55 miles per hour or higher, they may be related to increased traffic speed or to the location of establishments that serve or sell alcoholic beverages along high-speed roadways with few barriers or sidewalks. Again, the data point to the need for research and prevention efforts focusing on young adults, for the greatest percentage of intoxicated pedestrian deaths occurs in the 21- to 34-year-old age group (CDC 1994).

Develop Etiologic Models. As studies identify factors related to particular patterns of youthful drinking and particular alcohol-related problems in specific rural communities, their fit with existing etiologic models should be examined. Where results do not support hypothesized relationships or account for observed results, models should be adjusted or new etiologic frameworks should be proposed and tested. Because multiple negative outcomes may be associated with drinking by rural youth and because drinking patterns and other factors related to these outcomes may vary, a number of etiologic models may be needed, even in the same community. The formulation of alternative etiologic frameworks is consistent with researchers' conclusion that no single pathway is likely to explain and predict youthful drinking and the development of alcohol-related problems (Boyd et al. 1994). As with the theoretical model used in the Iowa Youth and Families Project (Conger and Elder 1994), models of youthful drinking should focus not only on individual, family, or peer variables, but should also include community and ecological variables characterizing rural environments. The need for more comprehensive rural models has been widely recognized (Alexander et al. 1992; Kelleher et al. 1992; Lichter et al. 1993; Moncher et al. 1990; Napier et al. 1981; OSAP 1990; U.S. Congress 1991).

Test Relationships Across Diverse Rural Communities. Comparing research findings and related etiologic models across rural communities and regions has considerable potential to advance theoretical understanding of youthful alcohol use and its consequences. The replication of relationships in diverse rural populations will help to identify drinking patterns and other phenomena that are consistently related to particular health and social problems. Results also will help to assess the relative importance of these factors in increasing risk and to determine the distribution of risk in rural areas. Conversely, failure to replicate relationships in diverse rural communities will direct research attention to variables that, if added to the etiologic equation, might help to explain idiosyncratic findings.

Holding variables constant or systematically varying them in selected community comparisons also will permit addressing unanswered research questions, empirically testing common assumptions, and developing and testing specific hypotheses concerning factors that predict youthful alcohol use and the occurrence of alcohol-related problems. For example, the vulnerability of youth to alcohol use is widely presumed to increase at the time they make the transition from elementary to middle or junior high (Dielman 1994; Steinberg 1991). Because rural districts vary in the grade level at which this transition occurs, as well as in school organization, changes in students' alcohol use rates could be compared under different conditions, (e.g., moving to the 7th grade in the same K to 12 building, moving to a 7 to 12 or a 7 to 9 building in the same community, or being bused to a 7 to 12 or a 7 to 9 building in a different community). If alcohol use prevalence increases regardless of differences in school organization and locale, changes in students' social identity and status may be a critical cause of drinking during school transitions. On the other hand, if increases in alcohol use prevalence vary by condition, school variables and changes in the peer group would merit further investigation.

Comparative longitudinal and ethnographic research in rural communities has great potential to reveal how individual, family, peer, and community risk and protective factors interact over time to influence patterns of youthful drinking and the occurrence of alcohol-related problems. Similarly, such studies would provide insight into how risk and protective factors change with adolescent and community development or with the emergence or amelioration of individual, family, peer, or community problems. Such research eventually may permit development and testing of a theoretically based, empirically grounded risk-assessment model for

communities, as well as for individuals and subgroups of youth defined by age, gender, race/ethnicity, or other characteristics.

To address these issues, funding agencies should:

- Support research to identify how patterns of youthful alcohol use and other factors are related to specific health and social problems experienced by youth living in diverse rural communities. Identifying consequences of heavy drinking among rural adolescent males and young adults should be a high priority.
- Prevention policy and research should recognize that different factors or combinations of factors, including different patterns of drinking, may be related to different consequences of youthful alcohol use; that causal factors may differ by age, gender, race/ethnicity, community characteristics, and other variables; and that different etiologic models therefore are needed.
- Funding agencies should support research to identify community as well as individual and family factors that influence youthful drinking and the occurrence of alcohol-related problems.

Study Current Prevention Programs and Policies

Despite the tensions that have developed around the evaluation of AOD use programs, rural prevention efforts do need to be evaluated for a number of reasons (Goplerud 1991; Kumpfer 1990). Those who have invested their time, talent, funds, and other resources in a program deserve to know the extent to which it is achieving its stated purpose and whether it has unintended side effects. Such accountability may be required to justify continuing costs to Congress, State legislatures, and funding sources. Outcome and impact evaluations also are needed to establish realistic expectations about what rural prevention programs can accomplish and to identify effective programs that should be continued, expanded, and disseminated. On the other hand, evaluation results showing that a program is having no or negative effects alert decision-makers that modifications are needed, that an alternative approach should be tried, or that resources might be better used in other ways.

Expanding the range of outcomes examined in evaluations of rural AOD use prevention programs would relieve a major source of resistance to such studies, while also enhancing their scientific value. As Dielman

(1994) has pointed out, exclusive reliance on any use of alcohol as the outcome of interest can obscure important program effects. Moreover, focusing on AOD use prevalence as the dominant indicator of program success does not adequately inform prevention policy (Reuter and Caulkins 1995). Multiple behavioral, social, and health endpoints therefore should be considered as legitimate focuses for evaluation (Perry 1986). The outcomes examined in specific evaluation studies should be determined not only by program objectives and rationale, but also by local community interests and expectations. Because program effects may differ for youth with differing levels of alcohol use at baseline, analyses should establish whether this is the case (Dielman 1994; Reuter and Caulkins 1995). Comparing outcomes of prevention programs implemented in different rural schools and communities may help to identify other factors mediating program effects.

Process evaluations and operations research also should be conducted to reveal whether a program is working as intended, as well as to determine how abstract concepts have been translated into practice, to identify effective models of program planning and implementation, and to uncover issues needing attention (e.g., Fox et al. 1988; Perry 1986; Tricker and Davis 1988). When programs are not ready for outcome evaluation (Dielman 1994), such studies can be a productive intermediate step. If their scope is broadened to consider the context in which existing AOD use prevention programs operate, process evaluations also can reveal a great deal about the nature of rural schools and communities, help to determine the extent to which particular prevention approaches are feasible in various types of rural settings, and identify the amount and type of technical assistance and other support required to make them successful. The following examples illustrate this vision and its potential.

Study Planning Processes. Assessing the processes of prevention planning can illuminate patterns of local leadership and relationships as well as the roots of concern about youthful AOD use in rural communities.

Such research should identify the events that triggered planning, the persons and organizations that took the lead, and others who became involved in the planning effort. Examining the extent to which needs assessment was conducted, the methods used, the information collected, and how it was applied can provide important insight into the quality of local data and decisionmaking processes. Documenting planning assumptions and factors considered in developing prevention strategies also can elucidate local knowledge and beliefs about youthful AOD use,

the acceptability of various prevention approaches in rural communities of differing characteristics, and logistic constraints limiting planning options.

Refine Principles of Prevention. Given the lack of evaluation, several investigators have examined promising programs (e.g., Goplerud 1991; Kumpfer 1990) or drawn on theory and other experience (e.g., Griffin 1986; Wittman 1984) to identify principles that should guide prevention efforts. For example, coordination with all sectors of the community, as well as with larger jurisdictions and national organizations, has been identified as an essential ingredient of program success. Coordination has been recommended with a staggering list of entities including student groups, families, parent associations, schools, religious institutions, government agencies, grassroots groups, legal systems, voluntary and service organizations, media, business, labor, health and human service professionals, law enforcement, alcoholic beverage industries, and the research community. The extent to which such coordination is feasible in rural areas has not been tested.

Studies of group and organizational participation in rural prevention programs therefore are needed to assess the degree to which coordination has been achieved and the outcomes of collaboration. Identifying the particular contributions of participating agencies and groups, mechanisms through which their involvement is coordinated, and barriers to collaboration would enlarge understanding of the potential for multi-sectorial involvement in rural prevention programs and ways this can be accomplished (Murray and Keller 1991; Youth Health Service 1994). Examining the roles various organizations have played in different rural communities could facilitate negotiation of new commitments. At the same time, such studies would provide insight into the resource structure of rural communities. Outcome studies should help to shed light on the types of coordination that are most critical.

Another frequently cited principle of prevention is that programs should be adapted to different cultures (e.g., Blum et al. 1992; Goplerud 1991; May 1989; Moncher et al. 1990; Skager et al. 1990). Program developers and staff are urged to be sensitive to ethnocultural values, beliefs, practices, traditions, and social environments, as well as to differences in reasons for drinking; the cultural meanings, values, and functions attached to alcohol use; and the mechanisms through which youth drinking patterns develop. They also have been advised to avoid cultural stereotyping (Oetting et al. 1989), to develop bicultural competence in

youth (Binion et al. 1988), and to address acculturation issues with sensitivity (Moncher et al. 1990). This is a tall order, but relatively little guidance is available for filling it in rural areas, and that is limited to Native American populations. Research on ways that programs have adapted to rural cultures and the success of these efforts would provide important information for prevention planning, as would studies of discrepancies between rural values and those espoused by programs imported from urban settings.

Study Rural Prevention Resources and Their Utilization. The capacity of rural schools and communities to prevent youthful alcohol use and alcohol-related problems depends on the resources available and how these are utilized. The survey of rural districts conducted by the GAO (1992b) provided some descriptive information about funding sources for school-based AOD use prevention programs, but the contributions of volunteers and in-kind donations from schools and other agencies were not assessed. No published data are available on the extent to which rural schools and communities are familiar with and use State and National resources for AOD use prevention (e.g., CSAP 1993a; National School Boards Association 1988; National Rural Health Association 1993; OSAP 1991) or on how rural users evaluate the resources provided.

Research therefore is needed to assess what resources are being used in rural prevention programs and to determine how these resources are organized and brought to bear on the problem. Because programs can have greater per-client costs in rural than in urban areas because of their "diseconomies of scale" (Wargo et al. 1990), and because the median amount of Federal drug education grants to rural districts is not sufficient to pay even one half-time salary, particular attention should be devoted to how well rural prevention plans are matched to resource availability, what can feasibly be accomplished with limited resources in different settings, and whether this scope of activity is likely to have a prevention effect. Issues related to program implementation should be studied in this context, for the availability and deployment of resources fundamentally affect the recruitment, training, supervision, and retention of staff; the strength of program leadership and management; the extent of program coordination and networking; and options for solving problems of program delivery in sparsely populated rural areas.

Other issues that merit investigation include the success of efforts to develop local resources, the effects of multiple funding sources on

program integration, and the extent to which rural prevention programs are dependent on external resources. Results will contribute to answering the larger policy question posed by Murray and Keller (1991): Are rural Americans becoming a new underclass that lacks the resources to manage its problems? If so, more comprehensive rural prevention strategies will be needed.

Study Policies To Control Alcohol Use by Rural Youth. Given the dearth of information about policies to control youthful alcohol use in rural areas, surveys are needed to ascertain what school and community policies are in place; the extent to which local, State, and national policies are enforced; and what penalties are imposed on rural minors when they are caught drinking. The relationships of these variables to patterns of youthful alcohol use and the prevalence of alcohol-related problems should be studied to assess the extent to which raising the legal drinking age and other policies have decreased or possibly increased drinking and heavy drinking among rural youth and young adults, especially those in the 18- to 21-year-old age group. Exploring whether underage drinkers in different policy environments consider themselves lawbreakers or believe that they can get away with breaking the law would further contribute to policy evaluation.

Defining characteristics of rural communities associated with different levels of alcohol control policies and policy enforcement would help to determine which policy approaches are most likely to be acceptable and effective in particular areas. For example, the following hypotheses generated from analyses by Giesbrecht and Pranovi (1986), Moskowitz (1989), and Kumpfer (1989) might be tested: (1) adoption and enforcement of policies to control youthful alcohol use will be weak in communities where youthful drinking does not violate normative standards; (2) community support for prevention programs, alcohol-related policies, and policy enforcement will vary inversely with the strength of informal social mechanisms to control youthful alcohol use; and (3) when the goals of alcohol use prevention programs and policies are not congruent with community norms about youthful drinking, these programs and policies will have little effect on patterns of youthful drinking.

If these hypotheses should be supported, then the research question for prevention is whether social norms can be changed in communities with a high tolerance of youthful drinking. By testing a multifaceted approach, the experiment now being conducted by Project Northland will provide important data on this issue (Perry et al. 1993). The cost-

effectiveness of communitywide interventions in changing the behavior of youth most at risk for alcohol abuse and alcohol-related problems merits close attention. And, as discussed below, other approaches for preventing alcohol use by rural youth also should be tested.

Key recommendations are that:

- Funding agencies should support research to study and evaluate the planning, implementation, acceptability, feasibility, and effectiveness of existing programs to prevent alcohol use by rural youth.
- Evaluations of rural alcohol use prevention programs should examine multiple endpoints and not solely the prevalence of youthful drinking. These evaluations should recognize that program effects may differ by individual and community characteristics, including baseline levels of alcohol use.
- Alcohol control policies in rural areas should be evaluated with particular attention to the effects of existing policies on alcohol use and alcohol-related problems among adolescents and young adults. Research should be conducted on the characteristics of rural communities associated with differing levels of alcohol control policies and policy enforcement.

Design and Evaluate New Prevention Approaches

As rural communities and those who work with them identify alcohol-related problems that are not being effectively prevented, new or modified approaches should be developed, implemented, and evaluated. Because each problem is likely to have a different etiology, a single problem definition probably will be inadequate to guide the development of prevention policies, programs, and research. Instead, different preventive approaches are likely to be needed, each with its own set of related goals, objectives, and methods. Although these initiatives should be informed by advances in etiological understanding and problem analyses in specific rural communities and regions, the following recommendations are likely to be broadly applicable.

Identify and Treat Symptomatic Drinking. Children who drink alcoholic beverages without adult supervision and adolescents who engage in compulsive drinking appear to be at high risk for alcohol abuse and alcoholism, as well as many other problems. These patterns

of drinking appear to be symptomatic of personality and family problems that also manifest themselves in other antisocial behaviors. Since youth whose drink symptomatically are a subset, albeit possibly a sizable one, of all youth in the community, these young people should not be treated through generalized prevention approaches (Dryfoos 1990). Efforts to prevent symptomatic drinking would not be appropriate. Rather, emphasis should be on early case-finding and treatment of the underlying causes that give rise to problem behavior. Individual and family therapeutic approaches may well be indicated (e.g., Binion et al. 1988), but special help with schoolwork, activities to develop skills and self-confidence, and other complementary approaches also may be needed. Outcomes should include improved individual and family functioning as evidenced not only by reduced alcohol use rates but also by gains in other areas.

Perry (1986) would accord lower priority to these secondary prevention approaches than to primary prevention because they imply policing behaviors, indicators of high risk are not perfect, and the effectiveness of intervention programs is not proven. However, these weaknesses should be addressed through research. Studies are needed to improve case-finding and referral methods in rural communities where both confidentiality and service availability may be a problem. The development of community-based techniques for identifying and serving adolescent alcohol abusers who are frequently absent from school or who have dropped out should be a high priority (Tobler 1992). Possibilities for detecting and treating youth with behavioral problems through rural health care providers may be especially promising (Sarvela and McClendon 1987b), particularly as managed care plans are extended to rural communities. Irwin and associates (1994) have made a number of recommendations relevant to pursuing these possibilities. Both the short- and long-term effects of intervention and of singling out rural children and adolescents for referral or special treatment should be evaluated.

Reduce Risks Related to Normative Drinking. Youth who drink with their age group in accord with local social patterns but who do not drink compulsively or exhibit other problem behaviors appear to be at low risk for alcohol abuse and chronic alcohol-related problems. However, because alcohol use reduces inhibitions and impairs judgment, even experimental or light drinkers may engage in risky behaviors that threaten their health and well-being. Because these behaviors are developmentally related, school-based programs provide one promising avenue for their prevention. Skill-building curriculums based on the social influences model that have been shown to delay the onset of

alcohol use among young urban and suburban adolescents should be tested in rural settings. As soon as results are available, CSAP and other agencies that provide drug prevention funds should strongly encourage the use of tested classroom programs at recommended grade levels. Incentives should be provided to promote teacher training in the selected curriculum and to ensure that it is taught in its entirety without omitting lessons.

High priority should be given to designing, implementing, and evaluating programs aimed at preventing alcohol use that leads to other risk-taking by rural high school students, especially in areas with a high prevalence of particular alcohol-related problems. Given changing gender roles during adolescence, the effectiveness of programs designed specifically for girls or boys should be explored. Research is urgently needed to develop and test prevention programs for older adolescent and young adult males who engage in heavy drinking (Gibbons et al. 1986a). These initiatives should aim to reduce not only the risk of alcohol-related problems for these drinkers, but also to attenuate or convert the influence that they have as drinking role models for younger teenagers. Another research priority is the development and testing of preventive interventions for rural youth of all ages who, as members of ethnic minority groups, drink either in accord with the norms of their own culture or with those of youth in the larger community.

The goals and objectives of these risk-reduction programs should identify problem-specific behaviors to be prevented (Thombs et al. 1994), such as driving after drinking or engaging in unprotected sexual intercourse. Objectives should encompass the prevention of alcohol misuse as well as use so that subgroups of youth who drink according to differing norms can set realistic limits for their own behavior (Dielman 1994; Engs and Fors 1988). Thus while some youth will embrace the goal of abstinence from drinking, others might commit to avoiding overindulgence, losing control due to intoxication, or suffering specific social consequences (Griffin 1986). Engs and Fors (1988) have cautioned that the goal of "responsible drinking" can have many meanings, so the term needs to be translated into concrete behavioral objectives. Multiple options for avoiding risk should be identified and youth should be provided with skill practice not only in making decisions about alcohol use, but also in identifying, avoiding, and managing risky situations. For example, youth should recognize that they can reduce the risk of being involved in an alcohol-related motor vehicle crash by not drinking at all, by not driving after drinking, by refusing to ride with a

drinking driver, by designating a driver who does not drink, or by signing a contract with parents to guarantee a ride home if needed.

Such problem-oriented curriculums should be complemented by activities in the school and the community that also are aimed at reducing the risk of alcohol-related problems. These could include many current approaches such as alcohol-free social events, developing peer leadership, and adopting stricter alcohol control policies. In addition, other precursors to problem occurrence should be modified (i.e., improving road conditions, lighting, and signage would help to prevent alcohol-related motor vehicle crashes, as would enforcing speed limits and seatbelt laws). Assumptions about the etiology of the problem and the way that school- and community-based activities are expected to change risk factors should be clearly identified (Kumpfer 1990) and tested. Process evaluations also should identify both effective and ineffective methods of program implementation. Results should be combined with outcome evaluations to examine strengths and weaknesses in overall program logic.

Promote the Healthy Development of Rural Youth, Families, and Communities. By supporting research on factors that protect youth against alcohol use and the development of programs that increase the competencies of individuals, families, and communities, the field of alcohol use prevention has recognized that health promotion is relevant to its objectives. Policy should make that recognition explicit. Moreover, as others have recommended, alcohol use research and prevention demonstrations should be incorporated within broader efforts to promote the healthy development of children and adolescents (Griffin 1986; Schaps and Battistich 1991).

Alcohol use prevention policy should also strongly support the development of healthy communities. Thus Blum and colleagues (1992) have pointed out that health promotion efforts for Native American and Alaska Native youth should be nested in a community development context that builds on the strengths of community identity and culture, promotes role models of accomplishment, and taps the exuberance, inherent optimism, and resilience of young people themselves. In discussing the implications of their quite different research on rural economic hardship, Conger and associates (1994) observed that from a policy perspective, the most fundamental means for reducing economic pressure and its adverse influences on adolescents and parents is to increase family economic well-being. Analyzing problems of physician shortages in rural areas led to a similar conclusion. According to Robert

Van Hook, former executive director of the National Rural Health Association:

We've got to develop rural America. We have to find a way to bring about some sort of renaissance in rural America so there are good schools, access to health care, and true economic development (Weisfeld 1993, p. 59).

Community development projects may help to curtail youthful drinking by providing new opportunities for recreation and social interaction in alcohol-free environments. However, actively engaging youth in the community development process may be a much more effective way of channeling their excess leisure time. Children, adolescents, and young adults can contribute to problem analysis, offer ideas for projects, and participate in activities to achieve community goals. Such involvement provides young people with meaningful social roles; builds their skills; provides ongoing and frequent opportunities for positive social and affective experiences; fosters cooperation; teaches the identification, development, and use of resources; promotes bonding with the community and its institutions; and builds young people's confidence in their capacity to help make life better.

Community development also responds to other recommendations for preventing alcohol use by youth (e.g., Binion et al. 1988; NIAAA 1994a). It is a multifaceted, coordinated approach that requires the combined efforts of families, schools, churches, social agencies, and other community institutions and groups. It provides alternative ways for youth to deal with personal and family problems as well as with feelings of boredom, unhappiness, worry, and nervousness. It is a positive and potent intervention that offers experiences to compete with the positive affective states associated with alcohol use. And it addresses risk factors in belief systems, social relationships, and the environment simultaneously.

While the potential of individual, family, and community health promotion for alcohol use prevention is clear, policy implications are clouded. Support has long been easier to obtain for categorical programs than for comprehensive initiatives promoting the public's health and welfare. Thus while current Federal and State policies may restrict the ability of administrators and practitioners to work with rural communities broadly (Murray and Keller 1991), recommendations for a shift in emphasis may deepen cuts for prevention and treatment without increasing funds for health promotion. The current policy climate

underscores the need for multisectorial collaboration in rural problem-solving and policy development.

To address these issues:

- Federal and State policies aimed at rural alcohol use prevention should support research and prevention programs with a broader range of goals than youth abstinence from alcohol use.
- Agencies, investigators, and practitioners engaged in the prevention of youthful alcohol use and related research should explore possibilities for working with partners from other sectors to promote the healthy development of rural youth, families, and communities, and to share funding for these initiatives.
- Federal and State policies should support comprehensive approaches to improving rural health and welfare.

Use Multiple Research Methods

Research in rural areas presents many methodological challenges; thus, a variety of quantitative and qualitative approaches should be employed to circumvent obstacles. Moreover, since each research method is associated with both strengths and limitations, using diverse data-collection and analytic techniques will enrich understanding. Reaching the same or similar conclusions through alternative methodologic pathways also helps to validate findings.

If prevention resources are to be targeted to rural areas where they are most needed, locales with a high prevalence of youthful alcohol use and alcohol-related problems need to be identified. This might be accomplished by oversampling rural communities and regions in existing national surveys. "Hot spots" for alcohol use by rural youth also might be identified through closer analyses of school AOD use surveys conducted by States. Information routinely collected by rural schools, health care providers, law enforcement agencies, and other sources also could be analyzed, and perhaps consolidated and mapped. Stories in rural newspapers can provide important information about alcohol-related problems and community concerns. CSAP grant applications and project reports from rural schools and communities also are likely to contain data and observations relevant to surveillance. These and other sources of data should be examined so that rural surveillance systems

can be developed to detect emerging problems, pinpoint geographic areas where prevention is most needed, and help to assess how both planned prevention initiatives and unplanned social change affect problem occurrence.

Research on the epidemiology and etiology of alcohol use by rural youth and the consequences of drinking behaviors should include not only quantitative approaches, but also ethnography, archival studies, observations, and other qualitative techniques. Individual and group interviews with rural youth, parents, teachers, health and social service personnel, county extension agents, police officers, sheriffs, religious leaders, local business people, oldtimers, and other key informants can provide insight into youthful drinking practices and their relationship to local norms. Douglas (1987) has observed that anthropological methods for comparing community structure would be eminently practicable for comparative studies of alcohol use. Alexander and colleagues (1992) have recommended process analysis (Peterson et al. 1987) to study environmental and behavioral precursors and consequences of both injuries and near injuries. These approaches, case studies, case-control epidemiological investigations, and cross-sectional surveys can help to analyze problems, generate hypotheses, suggest the relative importance of different variables, and identify potentially effective approaches to prevention. Longitudinal research, preferably involving successive cohorts of youth, is important in establishing causal relationships (e.g., Bloch et al. 1991; Boyd et al. 1994; U.S. Congress 1991).

More comparative research is needed to illuminate the heterogeneity of rural communities. Thus investigator-initiated research comparing youthful alcohol use in different communities should be solicited. NIAAA, NIDA, and other funding agencies also should foster exchange and collaborative problemsolving among rural researchers through conferences, newsletters, cooperative agreements, and other mechanisms. More analytical and integrative analyses should be conducted across existing data sets to address drug policy issues (Aday 1993). Techniques such as using common core questions also should be employed to validate data and to determine the extent of overlap in sampling frames (Aday 1993). In addition, funding agencies should consider collaborating on indepth case studies or periodic surveys of a jointly selected sample of rural communities stratified by size, proximity to urban areas, variations in alcohol use rates, and economic condition.

Creativity and more flexibility are needed in developing workable and methodologically solid approaches to program evaluation in rural areas. Evaluation should be structured, not as a burden to rural schools and communities, but as an opportunity for them to learn from what they are doing. Many approaches are possible, for as Sorensen and Hargreaves (1982) have illustrated, even with limited resources, an empirical attitude can lead to effective program evaluation in rural settings. For example, surveys or case studies can document issues in program planning and implementation. Intermediate outcomes of program activities can be assessed. Meta-analysis can be used to assess program effects in small schools and communities. Standardized data-collection questionnaires could be made available from a centralized service responsible for evaluation design and analysis of results. In return for training and technical assistance, several rural schools or communities might agree to a randomized test of the same program if those who serve as controls were guaranteed assistance with program implementation after the experimental period.

Data should be gathered, reported, and made accessible in ways that will inform the public and facilitate policy development, the selection of priorities, and the planning of prevention research and program initiatives. This pertains to local, State, and National levels (Human and Wasem 1991; Swaim et al. 1986). Therefore, to the extent possible, rural citizens should be involved in gathering, analyzing, and interpreting information about alcohol use and alcohol-related problems in their own communities. As Oetting and Beauvais (1990) have observed, a local survey can be an important intervention in and of itself. Reviewing demographic characteristics of the community and nonconfidential records also can help local program planners understand the unique characteristics of their community. Tracking such community information might become an ongoing project for a rural agency, service club, or high school social studies class. Data collected and analyzed by others but returned to the community also can help rural citizens to discuss their problems, monitor their progress in addressing them, and modify current prevention initiatives or plan new ones. Involving rural communities in research and evaluation thus fosters an interactive approach that is as important to the prevention of alcohol problems as the prevention programs themselves (Tuchfeld and Marcus 1984). Dialog and collaboration between those who live in rural communities and those who study rural youth also will enhance the quality of research and its

contribution to the development of rural America. Recommendations include:

- Alternative approaches to the evaluation of rural prevention programs should be developed and tested.
- Investigators and agencies collecting data on alcohol use by rural youth and alcohol-related problems in rural areas should collaborate with each other and with other agencies and disciplines to conduct more comprehensive studies of rural life.
- Rural youth and adults should be engaged in efforts to collect, analyze, and interpret data about alcohol use and alcohol-related problems in their own communities. Local databases should be established and used in prevention planning.

NOTES

1. Called standard metropolitan statistical area from 1959 to 1983.
2. Here "rural" refers to areas meeting both Census Bureau and OMB definitions of rural, or roughly 15 percent of the total U.S. population.
3. OSAP was renamed the Center for Substance Abuse Prevention (CSAP) in 1989 when the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) was reorganized as the Substance Abuse and Mental Health Services Administration (SAMHSA) within the National Institutes of Health.
4. Under that classification system, there are four types of rural areas. Adjacent rural areas are counties contiguous to or within MSAs, which are very similar to their urban neighbors. Urbanized rural areas are counties with a population of 25,000 or more but distant from an MSA. Frontier areas are counties with population densities of fewer than six persons per square mile; these are the most remote areas, with none existing east of the Mississippi River. Countryside rural areas include the remainder of the country not covered by metropolitan or other rural designations (Patton 1989).
5. National health objectives for the Year 2000 (DHHS 1991) do not mention rural youth.

REFERENCES

- Aday, L.A. *At Risk in America: The Health and Health Care Needs of Vulnerable Populations in the United States*. San Francisco: Jossey-Bass, 1993.
- Akers, R.L. *Drugs, Alcohol, and Society: Social Structure, Process, and Policy*. Belmont, CA: Wadsworth, 1992.
- Alexander, C.S., and Klassen, A.C. Drug use and illnesses among eighth grade students in rural schools. *Public Health Rep* 103(4):394-399, 1988.
- Alexander, C.S.; Ensminger, M.E.; Somerfield, M.R.; Kim, Y.J.; and Johnson, K.E. Behavioral risk factors for injury among rural adolescents. *Am J Epidemiol* 136(6):673-685, 1992.
- Allen, O., and Page, R.M. Variance in substance use between rural black and white Mississippi high school students. *Adolescence* 29(114):401-404, 1994.
- Atkin, C.; Hocking, J.; and Block, M. Teenage drinking: Does advertising make a difference? *J Communication* 34(2):157-167, 1984.
- Bachman, J.G., and Schulenberg, J. How part-time work intensity relates to drug use, problem behavior, time use, and satisfaction among high school seniors: Are these consequences or merely correlates? *Develop Psych* 29(2):220-235, 1993.
- Bachman, J.G.; Wallace, J.M., Jr.; O'Malley, P.M.; Johnston, L.D.; Kurth, C.L.; and Neighbors, H.W. Racial/ethnic differences in smoking, drinking, and illicit drug use among American high school seniors, 1976-89. *Am J Public Health* 81(3):372-377, 1991.
- Baker, K.; Beer, J.; and Beer, J. Self-esteem, alcoholism, sensation seeking, GPA, and differential aptitude test scores of high school students in an honor society. *Psychol Rep* 69(3, Pt. 2):1147-1150, 1991.
- Baker, S.P.; Whitfield, R.A.; and O'Neill, B. Geographic variations in mortality from motor vehicle crashes. *New Engl J Med* 316:1384-1387, 1987.
- Bandura, A. *Social Learning Theory*. Englewood Cliffs, NJ: Prentice-Hall, 1977.
- Bandura, A. *Social Foundations of Thought & Action*. Englewood Cliffs, NJ: Prentice-Hall, 1986.
- Bangert-Drowns, R. The effects of school-based substance abuse education: A meta-analysis. *J Drug Educ* 18:243-264, 1988.
- Baum, H.; Wells, J.; and Lund, A. Motor vehicle fatalities in the second year of the 65 mph speed limit. *J Safety Res* 21:1-8, 1990.
- Beauvais, F., and LaBoueff, S. Drug and alcohol abuse intervention in American Indian communities. *Int J Addict* 20(1):139-171, 1985.

- Beauvais, F.B.; Oetting, E.R.; Wolf, W.; and Edwards, R. American Indian youth and drugs, 1976-87: A continuing problem. *Am J Public Health* 79:634-636, 1989.
- Bell, R.M.; Ellickson, P.L.; and Harrison, E.R. Do drug prevention effects persist into high school? How project ALERT did with ninth graders. *Prev Med* 22(4):463-483, 1993.
- Benard, B.; Fafoglia, B.; and Perone, J. Knowing what to do—and not to do—reinvigorates drug education. *ASCD Curriculum Update*. Alexandria, VA: Association for Supervision and Curriculum Development, February 1987.
- Bender, L.D.; Green, B.L.; Hady, T.F.; Kuehn, J.A.; Nelson, M.K.; Perkinson, L.B.; and Ross, P.J. *The Diverse Social and Economic Structure of Non-metropolitan America*. Economics Research Service, Rural Development Research Report No. 49. Washington, DC: U.S. Department of Agriculture, 1985.
- Bennett, W.J. *What Works: Schools without Drugs*. Washington, DC: U.S. Department of Education, 1986.
- Berry, D.E. The emerging epidemiology of rural AIDS. *J Rural Health* 9(4): 293-304, 1993.
- Binion, A., Jr.; Miller, C.D.; Beauvais, F.; and Oetting, E.R. Rationales for the use of alcohol, marijuana, and other drugs by eighth-grade Native American and Anglo youth. *Int J Addict* 23(1):47-64, 1988.
- Blazer, D.; Crowell, B.A.; and George, L.K. Alcohol abuse and dependence in the rural South. *Arch Gen Psychiatry* 44:736-740, 1987.
- Bloch, L.P.; Crockett, L.J.; and Vicary, J.R. Antecedents of rural adolescent alcohol use: A risk factor approach. *J Drug Educ* 23(4):361-377, 1991.
- Blum, R.W.; Harmon, B.; Harris, L.; Bergeisen, L.; and Resnick, M.D. American Indian—Alaska Native youth health. *JAMA* 267(12):1637-1644, 1992.
- Boswell, J.; Fox, E.; Hubbard, B.; and Coyle, L. A comparison of HIV-related knowledge, attitudes, and behaviors among adolescents living in rural and urban areas of a southern city. *J Health Educ* 23(4):238-243, 1992.
- Botvin, G.J., and Wills, T.A. Personal and social skills training: Cognitive-behavioral approaches to substance abuse prevention. In: Bell, C.S., and Battjes, R.J., eds. *Prevention Research: Deterring Drug Abuse among Children and Adolescents*. National Institute on Drug Abuse Research Monograph No. 63. DHHS Pub. No. (ADM)85-1334. Washington, DC: Supt. of Docs., U.S. Govt. Print. Off., 1985. pp. 8-49.
- Botvin, G.J.; Baker, E.; Dusenbury, L.; Botvin, E.M.; and Diaz, T. Long-term follow-up results of a randomized drug abuse prevention trial in a white middle-class population. *JAMA* 273(14):1106-1112, 1995.

- Botvin, G.J.; Baker, E.; Renick, N.L.; Filazzola, A.D.; and Botvin, E.M. A cognitive-behavioral approach to substance abuse prevention. *Addict Behav* 9:137-147, 1984.
- Boyd, G.; Howard, J.; and Zucker, R. Youth and risk: An integrated perspective. In: Zucker, R.; Boyd, G.; and Howard, J., eds. *The Development of Alcohol Problems: Exploring the Biopsychosocial Matrix of Risk*. National Institute on Alcohol Abuse and Alcoholism Research Monograph 26. NIH Pub. No. 94-3405. Rockville, MD: U.S. Department of Health and Human Services. 1994. pp. v-xx.
- Braden, J.J., and Beauregard, K. *Health Status and Access to Care of Rural and Urban Populations*. National Medical Expenditure Survey Research Findings 18. (AHCPR Pub. No. 94-0031). Rockville, MD: Agency for Health Care Policy and Research, 1994.
- Breed, W., and De Foe, J.R. The portrayal of the drinking process on prime-time television. *J Communication* 31(1):58-67, 1981.
- Brown, L.P. *Reducing the Impact of Drugs on American Society*. Washington, DC: Office of National Drug Control Policy, March 1995.
- Bruvold, W., and Rundall, T. A meta-analysis and theoretical review of school based tobacco and alcohol intervention programs. *Psychol Health* 2:53-78, 1988.
- Bry, B.H.; McKeon, P.; and Pandina, R.J. Extent of drug use as a function of number of risk factors. *J Abnorm Psych* 91:273-279, 1982.
- Bureau of the Census. *Geographic Tools (Fact Finder for the Nation)*. Washington, DC: Supt. of Docs., U.S. Govt. Print. Off., 1978.
- Bureau of the Census. *Statistical Abstract of the United States: 1989*. 104th ed. Washington, DC: Supt. of Docs., U.S. Govt. Print. Off., 1989.
- Campanelli, P.D.; Dielman, T.E.; and Shope, J.T. Validity of adolescents' self-reports of alcohol use and misuse using a bogus pipeline procedure. *Adolescence* 22:8-22, 1987.
- Carpenter, R.A.; Lyons, C.A.; and Miller, W.R. Peer-managed self-control program for prevention of alcohol abuse in American Indian high school students. A pilot evaluation study. *Int J Addict* 20(2):299-310, 1985.
- Centers for Disease Control and Prevention. Motor-vehicle related deaths involving intoxicated pedestrians—United States 1982-1992. *Morb Mort Weekly Rep* 43(14):249-253, 1994.
- Center for Substance Abuse Prevention (CSAP). *Prevention Works!* NCADI Catalog, Fall/Winter 1993/94. Rockville, MD: U.S. Department of Health and Human Services, 1993a.

- Center for Substance Abuse Prevention. *Signs of Effectiveness in Preventing Alcohol and Other Drug Problems*. DHHS Pub. No. (SAM) 93-2001. Rockville, MD: U.S. Department of Health and Human Services, 1993b.
- Center for Substance Abuse Prevention. *Substance Abuse Prevention Demonstration Grants for High Risk Youth Populations*. Program Announcement No. AS-94-01. March, 1994.
- Chambers, C.D.; Inciardi, J.A.; and Siegal, H.A. The use and abuse of licit drugs in rural families. *Chem Depend Behav Biomed Issues* 4:153-165, 1982.
- Chen, K., and Kandel, D.B. The natural history of drug use from adolescence to the mid-thirties in a general population sample. *Am J Public Health* 85(1):41-47, 1995.
- Chi, P.S.K., and McClain, J. Drinking, farm, and camp life: A study of drinking behavior in migrant camps in New York State. *J Rural Health* 8:41-51, 1992.
- Christian, C.M.; Dufour, M.; and Berolucci, D. Differential alcohol-related mortality among American Indian tribes in Oklahoma. *Soc Sci Med* 28(3):275-284, 1989.
- Clayton, R.R. The delinquency and drug use relationship among adolescents: A critical review. In: Lettieri, D.J., and Ludford, J., eds. *Drug Abuse and the American Adolescent*. National Institute on Drug Abuse Research Monograph 38. DHHS Pub. No. (ADM) 81-1166. Washington, DC: Supt. of Docs., U.S. Govt. Print. Off., 1981.
- Cohen, J. *Survey of Rural Nebraska Youth Concerns*. Kearney, NE: South Central Comprehensive Community Mental Health Center, 1987. (Reprints available from the National Clearinghouse for Alcohol and Drug Information, Box 2345, Rockville, MD 20852).
- Cohen, S.B.; Braden, J.J.; and Ward, E.P. Enhancing the representation of rural areas in the national medical expenditure survey. *J Rural Health* 9(3):188-203, 1993.
- Collins, D., and Cellucci, T. Effects of a school-based alcohol education program with a media prevention component. *Psychol Rep* 69(1):191-197, 1991.
- Collins, J.J., and Messerschmidt, P.M. Epidemiology of alcohol-related violence. *Alcohol Health Res World* 17(2):93-100, 1993.
- Conger, R.D., and Elder, G.H., Jr. *Families in Troubled Times: Adapting to Change in Rural America*. New York: Aldine de Gruyter, 1994.
- Conger, R.D.; Ge, X.; Elder, G.H., Jr.; Lorenz, F.O.; and Simons, R.L. Economic stress, coercive family process, and developmental problems of adolescents. *Child Develop* 64:541-461, 1994.

- Conger, R.D.; Lorenz, F.O.; Elder, G.H., Jr.; Melby, J.N.; Simons, R.L.; and Conger, K.J. A process model of family economic pressure and early adolescent alcohol use. *J Early Adoles* 11(4):430-449, 1991.
- Conner, J.L., and Conner, C.N. Expected benefits of alcohol use on sexual behavior: Native American adolescents. *Psychol Rep* 70:91-98, 1992.
- Department of Health and Human Services. *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*. DHHS Pub. No. (PHS) 91-50212. Washington, DC: Supt. of Docs., U.S. Govt. Print. Off., 1991.
- De Foe, J.R.; Breed, W.; and Breed, L.A. Drinking on television: A five-year study. *J Drug Educ* 13(1):25-37, 1983.
- Dielman, T.E. School-based research on the prevention of adolescent alcohol use and misuse: Methodological issues and advances. *J Res Adoles* 4(2):271-293, 1994.
- Dignan, M.B.; Block, G.D.; Steckler, A.; and Cosby, M. Evaluation of the North Carolina risk reduction program for smoking and alcohol. *J Sch Health* 55(3):103-106, 1985.
- Dignan, M.B.; Steckler, A.; Block, G.D.; Howard, G.; and Cosby, M. Prevalence of health-risk behavior among seventh grade students in North Carolina. *South Med J* 79:295-302, 1986.
- Donovan, J.E., and Jessor, R. Problem drinking and the dimension of involvement with drugs: A Guttman scalogram analysis of adolescent drug use. *Am J Public Health* 73:543-552, 1983.
- Donnermeyer, J.F. Rural youth usage of alcohol, marijuana, and "hard" drugs. *Int J Addict* 28(3):249-255, 1993.
- Donnermeyer, J.F., and Huang, T.C. Age and alcohol, marijuana and hard drug use. *J Drug Educ* 21(3):255-268, 1991.
- Douglas, M. A distinctive anthropological perspective. In: Douglas, M., ed. *Constructive Drinking: Perspectives on Drink from Anthropology*. New York: Cambridge University Press, 1987. pp. 3-15.
- Dryfoos, J.G. *Adolescents at Risk: Prevalence and Prevention*. New York: Oxford University Press, 1990.
- Durant, R.H.; Ashworth, C.S.; Newman, C.; McGill, L.; Raubin, C.; and Barcnowski, T. AIDS/HIV knowledge level and perceived chance of having HIV among rural adolescents. *J Adoles Health* 13:499-505, 1992.
- Ellickson, P., and Bell, R.M. Drug prevention in junior high: A multisite longitudinal test. *Science* 247:1299-1305, 1990.
- Ellickson, P.L., and Hays, R.D. Antecedents of drinking among young adolescents with different alcohol use histories. *J Stud Alcohol* 52(5):398-408, 1991.

- Ellickson, P.; Bell, R.M.; and Harrison, E.R. Changing adolescent propensities to use drugs: Results from Project ALERT. *Health Educ Q* 20(2):227-242, 1993.
- Ellickson, P.L.; Hays, R.D.; and Bell, R.M. Stepping through the drug use sequence: Longitudinal scalogram analysis of initiation and regular use. *J Abnorm Psych* 101:441-450, 1992.
- Elliott, J. *Rural Students at Risk*. Elmhurst, IL: North Central Regional Educational Laboratory, 1988.
- Elliott, D.S.; Huizinga, D.; and Menard, S. *Multiple Problem Youth: Delinquency, Substance Use, and Mental Health Problems*. New York: Springer-Verlag, 1989.
- Elster, A.B.; Ketterlinus, R.; and Lamb, M.E. Association between parenthood and problem behavior in a national sample of adolescents. *Pediatrics* 85(6):1044-1050, 1990.
- Elster, A.; Panzarine, S.; and Holt, K., eds. *American Medical Association State-of-the-Art Conference on Adolescent Health Promotion: Proceedings*. Arlington, VA: National Center for Education in Maternal and Child Health, 1993.
- Engs, R.C., and Fors, S.W. Drug abuse hysteria: The challenge of keeping perspective. *J Sch Health* 58(1):26-28, 1988.
- Engstrom, D. A psychological perspective on prevention in alcoholism. In: Matarazzo, J.D.; Weiss, S.M.; Herd, J.A.; Miller, N.E.; and Weiss, S.M., eds. *Behavioral Health: A Handbook of Health Enhancement and Disease Prevention*. New York: John Wiley and Sons, 1984. pp. 1047-1058.
- Ennett, S.T.; Tobler, N.S.; Rinwalt, C.L.; and Flewelling, R.L. How effective is drug abuse resistance education? A meta-analysis of Project DARE outcome evaluations. *Am J Public Health* 84(9):1394-1401, 1994.
- Farrell, A.D.; Anchors, D.M.; Danish, S.J.; and Howard, C.W. Risk factors for drug use in rural adolescents. *J Drug Educ* 22(4):313-328, 1992.
- Fell, J.C. Alcohol involvement rates in fatal crashes: A focus on young drivers and female drivers. In: *Proceedings of the 31st Annual Conference of the American Association for Automotive Medicine*. New Orleans, September 28-30, 1987. Washington, DC: National Center for Statistics and Analysis, 1987.
- Foss, R.D.; Beirness, D.J.; and Sprattler, K. Seat belt use among drinking drivers in Minnesota. *Am J Public Health* 84(11):1732-1737, 1994.
- Fournet, G.P.; Estes, R.E.; Martin, G.L.; and Robertson, E.D. Drug and alcohol attitudes and usage among elementary and secondary students. *J Alcohol Drug Educ* 35(3):81-92, 1990.

- Fox, C.L.; Forbing, S.E.; and Anderson, P.S. A comprehensive approach to drug-free schools and communities. *J Sch Health* 58(9):365-369, 1988.
- Funkhouser, J.E.; Goplerud, E.N.; and Bass, R.O. Current status of prevention strategies. In: Jansen, M.A., ed. *A Promising Future: Alcohol and Other Drug Problem Prevention Services Improvement*. OSAP Prevention Monograph No. 10. DHHS Publication No. (ADM) 92-1807. Rockville, MD: Office for Substance Abuse Prevention, 1992. pp. 17-82.
- Gardner, S.E., and McColgan, B.R. Preface. In: Resnik, H., ed. *Youth and Drugs: Society's Mixed Messages*. OSAP Prevention Monograph 6. DHHS Pub. No. (ADM)90-1689. Rockville, MD.: Office for Substance Abuse Prevention, 1990. pp. v-vi.
- Gardner, S.E.; Green, P.F.; and Marcus, C. *Signs of Effectiveness II. Preventing Alcohol, Tobacco, and Other Drug Use: A Risk Factor/Resiliency-Based Approach*. DHHS Pub. No. (SAM) 94-2098. Washington, DC: U.S. Department of Health and Human Services, 1994.
- General Accounting Office. *Adolescent Drug Use Prevention: Common Features of Promising Community Programs*. Report to the Chairman, Subcommittee on Select Education, Committee on Education and Labor, House of Representatives. Washington, DC: U.S. General Accounting Office, 1992a.
- General Accounting Office. *Drug Education: Rural Programs Have Many Components and Most Rely Heavily on Federal Funds*. Report to the Chairman, Subcommittee on Labor, Health and Human Services, Education, and Related Agencies, Committee on Appropriations, House of Representatives. GAO/HRD-92-34. Washington, DC: U.S. General Accounting Office. 1992b.
- Gerbner, G. Stories that hurt: Tobacco, alcohol, and other drugs in the mass media. In: Resnik, H., ed. *Youth and Drugs: Society's Mixed Messages*. OSAP Prevention Monograph 6. DHHS Pub. No. (ADM)90-1689. Rockville, MD.: Office of Substance Abuse Prevention, 1990. pp. 53-127.
- Gfroerer, J., and De La Rosa, M. Protective and risk factors associated with drug use among Hispanic youth. *J Addict Dis* 12(2):87-107, 1993.
- Gibbons, S.; Wylie, M.L.; Echterling, L.; and French, J. Patterns of alcohol use among rural and small-town adolescents. *Adolescence* 21(84):887-900, 1986a.
- Gibbons, S.; Wylie, M.L.; Echterling, L.; and French, J. Situational factors related to rural adolescent alcohol use. *Int J Addict* 23(11):1183-1195, 1986b.

- Giesbrecht, N., and Pranovi, P. Prevention agenda in the context of drinking cultures. In: Giesbrecht, N., and Cox, A.E., eds. *Prevention: Alcohol and the Environment. Issues, Constituencies, and Strategies*. Papers and reports from a symposium held in Toronto, Canada, March 18-19, 1985. Toronto: Addiction Research Foundation, 1986. pp. 43-57.
- Gilchrist, L.D.; Schinke, S.P.; and Trimble, J.E. Skills enhancement to prevent substance abuse among American Indian adolescents. *Int J Addict* 22(9):869-879, 1987.
- Gitlin, T. On drugs and mass media in America's consumer society. In: Resnik, H., ed. *Youth and Drugs: Society's Mixed Messages*. OSAP Prevention Monograph 6. DHHS Pub. No. (ADM)90-1689. Rockville, MD: Office for Substance Abuse Prevention, 1990. pp. 31-52.
- Gleaton, T.J., and Smith, S.P. Drug use by urban and rural adolescents. *J Drug Educ* 11(1):1-8, 1981.
- Globetti, G.; Alsikafi, M.; and Morse, R. High school students and the use of alcohol in a rural community: A research note. *J Drug Issues* 8:435-441, 1978.
- Goodstadt, M.S. School-based drug education in North America: What is wrong? What can be done? *J Sch Health* 56(7):278-281, 1986.
- Goplerud, E.N. Introduction. In: Goplerud, E.N., ed. *Preventing Adolescent Drug Use: From Theory to Practice*. OSAP Prevention Monograph 8. DHHS Pub. No. (ADM) 91-1725. Rockville, MD: Office of Substance Abuse Prevention, 1991.
- Gordon, N.P., and McAlister, A.L. Adolescent drinking: Issues and research. In: Coates, T.J.; Petersen, A.C.; and Perry, C., eds. *Promoting Adolescent Health: A Dialog on Research and Practice*. New York: Academic Press, 1982. pp. 201-223.
- Greenberg, B.S. Smoking, drugging, and drinking in top rated TV series. In: Eisman, S.; Wingard, J.; and Huba, G., eds. *Drug Abuse: Foundation for a Psycho-Social Approach*. New York: Baywood, 1984. pp. 198-204.
- Greenberg, B.S.; Fernandez-Collado, C.; Graef, D.; Korzeny, F.; and Atkins, C.K. Trends in use of alcohol and other substances on television. In: Eisman, S.; Wingard, J.; and Huba, G., eds. *Drug Abuse: Foundation for a Psycho-Social Approach*. New York: Baywood, 1984. pp. 187-197.
- Griffin, T. Community-based chemical use problem prevention. *J Sch Health* 56(9):414-417, 1986.
- Grossman, M.; Chaloupka, F.J.; Saffer, H.; and Laixuthai, A. Effects of alcohol price policy on youth: A summary of economic research. *J Res Adolesc* 4(2):347-364, 1994.

- Guillory, B.M.; Willie, E.; and Duran, E.F. Analysis of a community organizing case study: Alkali Lake. *J Rural Comm Psychol* 9(1):27-36, 1988.
- Gusfield, J.R. *The Culture of Public Problems: Drinking-driving and the Symbolic Order*. Chicago: University of Chicago Press, 1981.
- Hahn, D.B. A statewide comparison of student alcohol and marijuana use patterns at urban and rural public schools. *J Sch Health* 52(4):250-255, 1982.
- Hamburg, D.A., and Takanishi, R. Preparing for life: The critical transition of adolescence. *Am Psychol* 44:825-827, 1989.
- Hansen, W.B. School-based alcohol prevention programs. *Alcohol Health Res World* 17(1):54-60, 1993.
- Hansen, W.B. School-based substance abuse prevention: A review of the state of the art in curriculum, 1980-1990. *Health Educ Res* 7(3):403-430, 1992.
- Hansen, W.B., and Graham, J.W. Preventing alcohol, marijuana, and cigarette use among adolescents: Peer pressure resistance training versus establishing conservative norms. *Prev Med* 20(13):414-430, 1991.
- Hawkins, J.D.; Lishner, D.M.; Catalano, R.F.; and Howard, M.O. Childhood predictors of adolescent substance abuse: Toward an empirically grounded theory. *J Child Contemp Soc* 8:11-48, 1986.
- Hayes, R.D., and Revetto, J.P. Peer cluster theory and adolescent drug use: A reanalysis. *J Drug Educ* 20(3):191-198, 1990.
- Heavner, R.R.; Swinker, M.; and Arbogast, J.G. Adolescent perceptions of teenage morbidity and mortality in a rural population. *W Virg Med J* 87(5):207-209, 1991.
- Helge, D. *A National Study Regarding At-Risk Students*. Bellingham, WA: National Rural Development Institute, 1990.
- Hernandez, J.T. Substance abuse among sexually abused adolescents and their families. *J Adoles Health* 13(8):658-662, 1992.
- Hewitt, M. *Defining "Rural" Areas: Impact on Health Care Policy and Research*. Washington, DC: Supt. of Docs., U.S. Govt. Print. Off., 1989.
- Hibbard, R.A.; Ingersoll, G.M.; and Orr, D.P. Behavioral risk, emotional risk, and child abuse among adolescents in a nonclinical setting. *Pediatrics* 86(6):896-901, 1990.
- Hingson, R.W.; Strunin, L.; Berline, B.M.; and Heeren, T. Beliefs about AIDS, use of alcohol and drugs, and unprotected sex among Massachusetts adolescents. *Am J Public Health* 80(3):295-299, 1990.
- Hingson, R.; Howland, J.; Morelock, S.; and Heeren, T. Legal interventions to reduce drunken driving and related fatalities among youthful drivers. *Alcohol Drugs Driving* 4(2):87-98, 1988.

- Holcomb, D.R.; Sarvela, P.D.; Ritzel, D.O.; Sliepcevich, E.M.; and Jellen, H.G. Self-reported negative consequences of drug use among rural adolescents. *Health Educ* 21(4):36-40, 1990.
- Hopkins, R.H.; Mauss, A.L.; Kearney, K.A.; and Weisheit, R.A. Comprehensive evaluation of a model alcohol education curriculum. *J Stud Alcohol* 49:38-50, 1988.
- House, E.A.; Durgee, M.F.; and Bryan, C.K. A survey of psychological and social concerns of rural adolescents. *Adolescence* 14(54):361-376, 1979.
- Howard, J.; Boyd, G.M.; and Zucker, R.A. Overview of issues. *J Res Adoles* 4(2):175-181, 1994.
- Human, J., and Wasem, C. Rural mental health in America. *Am Psychol* 46(3):232-239, 1991.
- Humphreys, K., and Rappaport, J. From the community mental health movement to the War on Drugs: A study in the definition of social problems. *Am Psychol* 48:892-901, 1993.
- Indian Health Service. *School/Community Based Alcoholism/Substance Abuse Prevention Survey*. Rockville, MD: U.S. Department of Health and Human Services, 1987.
- Irwin, C.E.; Brindis, C.; Holt, K.A.; and Langlykke, K., eds. *Health Care Reform: Opportunities for Improving Adolescent Health*. Arlington, VA: National Center for Education in Maternal and Child Health, 1994.
- Jessor, R., and Jessor, S.L. Adolescent development and the onset of drinking: A longitudinal study. *J Stud Alcohol* 36:27-51, 1975.
- Jessor, R., and Jessor, S.L. *Problem Behavior and Psychosocial Development: A Longitudinal Study of Youth*. New York: Academic Press, 1977.
- Johnson, J.A. Rural communities need antidrug resources, too. Northwest Regional Educational Laboratory. *Western Center News*, September 1993. p. 2.
- Johnston, L.D., and O'Malley, P.M. Issues of validity and population coverage in student surveys of drug use. In: Rouse, B.A.; Kozel, N.J.; and Richards, L.G., eds. *Self-report Methods of Estimating Drug Use: Meeting Current Challenges in Validity*. National Institute on Drug Abuse Research Monograph 57. DHHS Pub. No. (ADM) 85-1402. Washington, DC: Supt. of Docs., U.S. Govt. Print. Off., 1985.
- Johnston, L.D.; Bachman, J.G.; and O'Malley, P.M. *Drugs and the Class of '78: Behaviors, Attitudes, and Recent Trends*. Rockville, MD: National Institute on Drug Abuse, 1979.
- Johnston, L.D.; O'Malley, P.M.; and Bachman, J.G. *National Survey Results on Drug Use from Monitoring the Future Study, 1975-1992. Volume 1: Secondary School Students*. Rockville, MD: National Institute on Drug Abuse, 1993.

- Johnston, L.D.; O'Malley, P.M.; and Bachman, J.G. *National Survey Results on Drug Use from Monitoring the Future Study, 1975-1993. Volume 1: Secondary School Students*. Rockville, MD: National Institute on Drug Abuse, 1994.
- Johnstone, B.M. Sociodemographic, environmental, and cultural influences on adolescent drinking behavior. In: Zucker, R.; Boyd, G.; and Howard, J., eds. *The Development of Alcohol Problems: Exploring the Biopsychosocial Matrix of Risk*. National Institute on Alcohol Abuse and Alcoholism Research Monograph 26. NIH Pub. No. 94-3405. Rockville, MD: U.S. Department of Health and Human Services, 1994. pp. 169-203.
- Kandel, D.B. Stages in adolescent involvement in drug use. *Science* 190:912-914, 1975.
- Kandel, D.B. Drug and drinking behavior among youth. *Ann Rev Sociol* 6:235-285, 1980.
- Kandel, D.B. Epidemiological and psychological perspectives on adolescent drug abuse. *J Am Acad Clin Psychiatry* 21:328-347, 1982.
- Kandel, D.B. Early onset of adolescent sexual behavior and drug involvement. *J Marriage Fam* 52(3):783-798, 1990.
- Kandel, D.B.; Davies, M.; Karus, D.; and Yamaguchi, K. The consequences in young adulthood of adolescent drug involvement. *Arch Gen Psychiatry* 43:746-754, 1986.
- Kelleher, K.J.; Rickert, V.I.; Hardin, B.H.; Pope, S.K.; and Farmer, F.L. Rurality and gender. Effects on early adolescent alcohol use. *Am J Dis Children* 146(d):317-322, 1992.
- Kidd, P.S., and Holton, C. Driving practices, risk-taking motivations, and alcohol use among adolescent drivers: A pilot study. *J Emerg Nurs* 19(4):292-296, 1993.
- Kilty, K.M. Drinking styles of adolescents and young adults. *J Stud Alcohol* 51(6):556-564, 1990.
- Kim, S. A short- and long-term evaluation of Here's Looking at You alcohol education program. *J Drug Educ* 18(3):235-242, 1988.
- Klitzner, M. A public health/dynamic systems approach to community-wide alcohol and other drug initiatives. In: Davis, R.C.; Lurigio, A.J.; and Rosenbaum, D.P., eds. *Drugs and the Community: Involving Community Residents in Combatting the Sale of Illegal Drugs*. Springfield, IL: Charles C. Thomas, 1993.
- Klitzner, M.; Bamberger, E.; and Gruenewald, P.J. The assessment of parent-led prevention programs: A national descriptive survey. *J Drug Educ* 20(2):111-125, 1990a.
- Klitzner, M.; Gruenewald, P.J.; and Bamberger, E. The assessment of parent-led prevention programs. A preliminary assessment of impact. *J Drug Educ* 20(1):77-94, 1990b.

- Kneidek, T. Drug-free schools and communities. *Northwest Rep* Nov/Dec 1989. pp. 6-7.
- Kumpfer, K.L. Prevention of alcohol and drug abuse: A critical review of risk factors and prevention strategies. In: Schaffer, D.; Philips, I.; and Enzer, N.B., eds. *Prevention of Mental Disorders, Alcohol and Other Drug Use in Children and Adolescents*. OSAP Prevention Monograph 2. DHHS Publication No. (ADM) 89-1746. Rockville, MD: U.S. Department of Health and Human Services, 1989. pp. 309-371.
- Kumpfer, K.L. Challenges to prevention programs in schools: The thousand flowers must bloom. In: *Prevention Research Findings: 1988*. OSAP Prevention Monograph 3. DHHS Publication No. (ADM) 91-1615. Rockville, MD: U.S. Department of Health and Human Services, 1990. pp. 108-123.
- LaFromboise, T.D. American Indian mental health policy. *Am Psychol* 43:388-397, 1988.
- Lassey, M.L., and Carlson, J.E. Drinking among rural youth: The dynamics of parental and peer influence. *Int J Addict* 15(1):61-75, 1980.
- Laws, K. *Rural Alcohol and Other Drug Prevention Strategies: Abstracts of Selected Articles and Research Studies*. Portland, OR: Northwest Regional Educational Laboratory, 1991.
- LeMaster, P.L., and Connell, C.M. Health education interventions among Native Americans: A review and analysis. *Health Educ Q* 21(4):521-538, 1994.
- Lichter, D.T., and Eggebeen, D.J. Child poverty and the changing rural family. *Rural Sociol* 57:151-72, 1992.
- Lichter, D.T.; Cornwell, G.T.; and Eggebeen, D.J. Harvesting human capital: Family structure and education among rural youth. *Rural Soc* 58(1):53-75, 1993.
- Long, K.A., and Boik, R.J. Predicting alcohol use in rural children: A longitudinal study. *Nursing Res* 42(2):79-86, 1993.
- Lorion, R.P.; Bussell, D.; and Goldberg, R. Identification of youth at high risk for alcohol or other drug problems. In: Goplerud, E.N., ed. *Preventing Adolescent Drug Use: From Theory to Practice*. OSAP Prevention Monograph No. 8. DHHS Pub. No. (ADM) 91-1725. Rockville, MD: U.S. Department of Health and Human Services, 1991. pp. 53-89.
- Lorion, R.P.; Ross, J.G.; Gardner, S.E.; and Bass, R.D. Programs for change: A realistic look at the nation's potential for preventing substance involvement among high-risk youth. OSAP Special Issues. *J Comm Psychol* pp. 3-9, 1992.
- Mahoney, M.C. Fatal motor vehicle traffic accidents among Native Americans. *Am J Prev Med* 7(2):112-116, 1991.

- Malvin, J.H., and Moskowitz, J.M. Anonymous versus identifiable self-reports of adolescent drug attitudes, intentions, and use. *Pub Opin Q* 47:557-566, 1983.
- Martin, M.J., and Pritchard, M.E. Factors associated with alcohol use in later adolescence. *J Stud Alcohol* 52(1):5-9, 1991.
- May, P.A. Alcohol and drug misuse prevention programs for American Indians: Needs and opportunities. *J Stud Alcohol* 47(3):187-195, 1986.
- May, P.A. Alcohol abuse and alcoholism among American Indians: An overview. In: Watts, T.D., and Wright, R., eds. *Alcoholism in Minority Populations*. Springfield, IL: Charles C Thomas, 1989. pp. 95-119.
- May, P.A., and Moran, J.R. Prevention of alcohol misuse: A review of health promotion efforts among American Indians. *Am J Health Prom* 9(4):288-299, 1995.
- McCarthy, P.S. The effects of higher rural interstate speed limits in alcohol-related accidents. *J Health Econ* 11:281-299, 1993.
- McGranahan, D.A., and Ghelfi, L.M. The education crisis and rural stagnation in the 1980's. In: *Education and Rural Economic Development: Strategies for the 1990's*. Economic Research Service, Staff Report No. AGES 9153. Washington, DC: U.S. Department of Agriculture, 1991.
- McManus, M.A., and Newacheck, P.W. Rural maternal, child, and adolescent health. *Health Serv Res* 23(6):809-848, 1989.
- Melear, L.L., ed. *Educator's Guide to Drug Prevention*. Atlanta: Melear Multi-Media, Inc., 1990.
- Mick, S.S.; Morlock, L.L.; Salkever, D.; deLissovoy, G.; Malitz, F.E.; and Jones, A.S. Rural hospital-based alcohol and chemical abuse services: Availability and adoption, 1983-1988. *J Stud Alcohol* 54:488-501, 1993.
- Miller, S.I. Alcoholism prevention: Introduction. In: Matarazzo, J.D.; Weiss, S.M.; Herd, J.A.; Miller, N.E.; and Weiss, S.M., eds. *Behavioral Health: A Handbook of Health Enhancement and Disease Prevention*. New York: John Wiley and Sons, 1984. pp. 1039-1040.
- Mirzaee, E.; Kingery, P.M.; and Pruitt, B.E. Sources of drug information among adolescent students. *J Drug Educ* 21(2):95-106, 1991.
- Moffatt, K.; Gliksman, L.; and Douglas, R. Rural independent movie theaters as a channel for disseminating alcohol information. *Human Serv Rural Environ* 13(2):36-39, 1989.
- Moncher, M.S.; Holden, G.W.; and Trimble, J.E. Substance abuse among Native-American youth. *J Consult Clin Psych* 58(4):408-415, 1990.

- Moskowitz, J.M. The primary prevention of alcohol problems: A critical review of the research literature. *J Stud Alcohol* 50:54-88, 1989.
- Murray, J.D., and Keller, P.A. Psychology and rural America: Current status and future directions. *Am Psychol* 46:220-231, 1991.
- Napier, T.L.; Carter, T.J.; and Pratt, M.C. Correlates of alcohol and marijuana use among rural high school students. *Rural Sociol* 46:319-332, 1981.
- Napier, T.L.; Goe, R.; and Bachtel, D.C. An assessment of the influence of peer association and identification of drug use among rural high school students. *J Drug Educ* 14:227-248, 1984.
- National Highway Traffic Safety Administration. *Traffic Safety Facts 1993: Alcohol*. Washington, DC: U.S. Department of Transportation, 1993a.
- National Highway Traffic Safety Administration. *Traffic Safety Facts 1993: State Alcohol Estimates*. Washington, DC: U.S. Department of Transportation, 1993b.
- National Institute on Alcohol Abuse and Alcoholism. *Alcohol and Health*. Eighth Special Report to the U.S. Congress, September 1993. NIH Publication No. 94-3699. Rockville, MD: U.S. Department of Health and Human Services, 1994a.
- National Institute on Alcohol Abuse and Alcoholism. Alcohol and minorities. *Alcohol Alert* No. 23:1-4, January 1994b.
- National Institute on Alcohol Abuse and Alcoholism. Alcohol use and abuse: Where do the numbers come from? *Alcohol Alert* No. 7, PH 278, January 1990.
- National Institute on Drug Abuse. *National Household Survey on Drug Abuse: Main Findings 1990*. DHHS Pub. No. (ADM) 91-1788. Rockville, MD: U.S. Department of Health and Human Services, 1991.
- National Institute on Drug Abuse. *National Trends in Drug Use and Related Factors among American High School Students and Young Adults, 1975-1986*. DHHS Pub. No. (ADM) 897-1535. Washington, DC: U.S. Department of Health and Human Services, 1987.
- National Institute on Drug Abuse. *Treatment Research Report: Drug Abuse in Rural America*. Pub. No. (ADM)81-1040. Rockville, MD: National Institute on Drug Abuse, 1980.
- National Rural Health Association. *Rural Mental Health and Substance Abuse Resources Directory 1993*. Rockville, MD: Office of Rural Health Policy, 1993.
- National Safety Council. *Accident Facts*. Chicago: National Safety Council, 1988.

- National School Boards Association (NSBA). *Alcohol and Drugs in the Public Schools: Implications for School Leaders*. Washington, DC: NSBA, 1988.
- Newcomb, M.D., and Bentler, P.M. *Consequences of Adolescent Drug Use: Impact on the Lives of Young Adults*. Newbury Park, CA: Sage, 1988.
- Newcomb, M.D., and Harlow, L.L. Life events and substance use among adolescents: Mediating effects of perceived loss of control and meaningless in life. *J Pers Soc Psychol* 51(3):564-577, 1986.
- Newcomb, P.R., and Sarvela, R.D. Familial factors related to rural youth drinking practices. *Human Services Rural Environ* 12(1):6-10, 1988.
- Newcomb, M.D.; Maddahian, E.; and Bentler, P.M. Risk factors for drug use among adolescents: Concurrent and longitudinal analyses. *Am J Public Health* 76:525-531, 1986.
- Oetting, E.R., and Beauvais, F. Peer cluster theory, socialization characteristics, and adolescent drug use: A path analysis. *J Counsel Psychol* 34:205-213, 1987.
- Oetting, E.R., and Beauvais, F. Adolescent drug use: Findings of national and local surveys. *J Consult Clin Psychol* 58(4):385-394, 1990.
- Oetting, E.R.; Beauvais, F.; and Edwards, R.W. Alcohol and Indian youth: Social and psychological correlates and prevention. *J Drug Issues* 18:87-101, 1988.
- Oetting, E.R.; Swaim, R.C.; Edwards, R.W.; and Beauvais, F. Indian and Anglo adolescent alcohol use and emotional distress: Path models. *Am J Drug Alcohol Abuse* 15(2):153-172, 1989.
- Office of Juvenile Justice and Delinquency Prevention (OJJDP). *The Office of Juvenile Justice and Delinquency Prevention Brochure*. NCJ No. 144527. Washington, DC: Supt. of Docs., U.S. Govt. Print. Off., 1993.
- Office for Substance Abuse Prevention. *Breaking New Ground for American Indian and Alaska Native Youth at Risk: Program Summaries*. OSAP Technical Report 3. DHHS Pub. No. (ADM)90-1705. Rockville, MD: U.S. Department of Health and Human Services, 1990.
- Office for Substance Abuse Prevention. *Message and Material Review Process*. OSAP policy review guidelines. Rockville, MD: Office for Substance Abuse Prevention, 1989. pp. 10-11.
- Office for Substance Abuse Prevention. *Prevention Resource Guide: Rural Communities*. DHHS Pub. No. (ADM)91-1795. Rockville, MD: U.S. Department of Health and Human Services, 1991.

- Palmer, J.H., and Ringwalt, C.L. Prevalence of alcohol and drug use among North Carolina public school students. *J Sch Health* 58(7):288-291, 1988.
- Pandina, R.J. Methods, problems, and trends in studies of adolescent drinking practices. *Adoles Drinking Pract* 8:20-26, 1986.
- Patton, L. Setting the rural health services research agenda: The congressional perspective. *Health Serv Res* 23(6):1005-1051, 1989.
- Pendorf, J.E. The role of alcohol abuse in career decision-making readiness among high school students. *J Alcohol Drug Educ* 36(3):54-63, 1991.
- Pernanen, K. Research approaches in the study of alcohol-related violence. *Alcohol Health Res World* 17(2):101-107, 1993.
- Perry, C.L. Community-wide health promotion and drug abuse prevention. *J Sch Health* 56(9):359-363, 1986.
- Perry, C.L.; Williams, C.L.; Forster, J.L.; Wolfson, M.; Wagenaar, A.C.; Finnegan, J.R.; McGovern, P.G.; V-Mortenson, S.; Komro, K.A.; and Anstine, P. Background, conceptualization, and design of a communitywide research program on adolescent alcohol use: Project Northland. *Health Educ Res* 8(1):125-136, 1993.
- Peterson, L.; Farmer, J.; and Mori, L. Process analysis of injury situations: A complement to epidemiological methods. *J Soc Issues* 43:33-44, 1987.
- Peterson, P.L.; Hawkins, J.D.; Abbott, R.D.; and Catalano, R.F. Disentangling the effects of parental drinking, family management, and parental alcohol norms on current drinking by black and white adolescents. *J Res Adoles* 4(2):203-227, 1994.
- Polich, J.M. The validity of self-reports in alcoholism research. *Addict Behav* 7:123-132, 1982.
- Polich, J.; Ellickson, P.; Reuter, P.; and Kahan, J. *Strategies for Controlling Adolescent Drug Use*. Santa Monica, CA: Rand Corporation, 1984.
- Popkin, C.L. Drinking and driving by young females. *Accid Anal Prev* 23(1):37-44, 1991.
- Price, R.H., and Lorion, R.P. Prevention programming as organizational reinvention: From research to implementation. In: Schaffer, D.; Philips, I.; and Enzer, N.B., eds. *Prevention of Mental Disorders, Alcohol and Other Drug Use in Children and Adolescents*. OSAP Prevention Monograph 2. DHHS Pub. No. (ADM)89-1746. Rockville, MD: U.S. Department of Health and Human Services, 1989. pp. 97-123.
- Reuter, P., and Caulkins, J.P. Redefining the goals of national drug policy: Recommendations from a working group. *Am J Public Health* 85(8):1059-1063, 1995.

- Reynolds, R.C.; Banks, S.A.; and Murphree, A.H. *The Health of a Rural Community: Perspectives and Problems*. Gainesville, FL: The University Presses of Florida, 1976.
- Rhodes, J.E., and Jason, L.A. *Preventing Substance Abuse among Children and Adolescents*. New York: Pergamon Press, 1988.
- Richmond, J., and Peebles, D. Rural drug abuse prevention: A structured program for middle schools. *J Couns Devel* 63:113-114, 1984.
- Rissel, C.; Finnegan, J.; Wolfson, M.; and Perry, C. Factors which explain amount of participation in rural adolescent alcohol use prevention task forces. *Am J Health Prom* 9(3):169-171, 1995.
- Robins, L., and Przybeck, T. In: Jones, C., and Battjes, R., eds. *Etiology of Drug Abuse: Implications for Prevention*. Rockville, MD: National Institute on Drug Abuse, 1985.
- Rundall, T.G., and Bruvold, W.H. A meta-analysis of school-based smoking and alcohol use prevention programs. *Health Educ Q* 15(3):317-334, 1988.
- Sarvela, P.D. Age of first use of drugs among rural Midwestern youth. *Hum Serv Rural Environ* 13(3):9-15, 1990.
- Sarvela, P.D., and McClendon, E.J. Correlates of early adolescent peer and personal substance use in rural Northern Michigan. *J Youth Adoles* 12:319-332, 1983.
- Sarvela, P., and McClendon, E.J. An impact evaluation of a rural youth drug education program. *J Drug Educ* 17(3):213-231, 1987a.
- Sarvela, P.D., and McClendon, E.J. Early adolescent alcohol abuse in rural northern Michigan. *Comm Mental Health J* 23(3):183-191, 1987b.
- Sarvela, P.D., and McClendon, E.J. Indicators of rural youth drug use. *J Youth Adolesc* 17(4):335-347, 1988.
- Sarvela, P.D.; Newcomb, P.R.; and Duncan, D.F. Drinking and driving among rural youth. *Health Educ Res* 3(2):197-201, 1988a.
- Sarvela, P.D.; Newcomb, P.R.; and Littlefield, E.A. Sources of drug and alcohol information among rural youth. *Health Educ* 19(3):27-31, 1988b.
- Sarvela, P.D.; Pape, D.J.; Odulana, J.; and Bajracharya, S.M. Drinking, drug use, and driving among rural midwestern youth. *J Sch Health* 60(5):215-219, 1990.
- Schaps, E., and Battistich, V. Promoting health development through school-based prevention: New approaches. In: Goplerud, E.N., ed. *Preventing Adolescent Drug Use: From Theory to Practice*. OSAP Prevention Monograph 8. DHHS Pub. No. (ADM)91-1725. Rockville, MD: U.S. Department of Health and Human Services, 1991. pp. 127-181.
- Schaps, E., and Slimmon, L. *Balancing Head and Heart: Sensible Ideas for Prevention of Drug and Alcohol Abuse*. Book 2. Lafayette, CA: Prevention Materials Institute Press, 1975.

- Schaps, E.; Moskowitz, J.; Malvin, J.; and Schaeffer, G. Evaluation of seven school-based prevention programs: A final report on the Napa Project. *Int J Addict* 21:1081-1112, 1986.
- Schinke, S.P., Moncher, M.S.; Palleja, J.; Zayas, L.H.; and Schilling, R.F. Hispanic youth, substance abuse, and stress: Implications for prevention research. *Int J Addict* 23(8):809-826, 1988a.
- Schinke, S.P., Orlandi, M.A.; Botvin, G.J.; Trimble, J.E.; Gilchrist, L.D.; and Lockyear, V.S. Preventing substance abuse among American-Indian adolescents: A bicultural competence skills approach. *J Counsel Psychol* 35(1):87-90, 1988b.
- Schroeder, R. Retreats target civic leaders and schools. *Alcoholism Addict* Jan/Feb 1988.
- Semlitz, L., and Gold, M.S. Adolescent drug abuse: Diagnosis, treatment, and prevention. *Psychiat Clin N Am* 9:455-473, 1986.
- Shedler, J., and Block, J. Adolescent drug use and psychological health: A longitudinal inquiry. *Am Psychol* 45(5):612-630, 1990.
- Silverman, W.H. Prevalence of substance use in a rural teenage population. *J Adoles Chem Depen* 2(1):107-117, 1991.
- Single, E.; Kandel, D.; and Johnson, B.D. The reliability and validity of drug use responses in a large scale longitudinal survey. *J Drug Issues* 5:426-443, 1975.
- Sixty-Sixth American Assembly. *Public Policy on Alcohol Problems*. Final Report of the Sixty-Sixth American Assembly. New York: Columbia University, 1984.
- Skager, R., and Fisher, D.G. Substance use among high school students in relation to school characteristics. *Addict Behav* 14:129-138, 1989.
- Skager, R.; Austin, G.A.; and Frith, S.L. *Biennial Statewide Survey of Drug and Alcohol Use among California Students in Grades 7, 9, and 11: Winter 1989-90*. Report prepared by Southwest Regional Laboratory under contract from State of California, Department of Justice, Office of the Attorney General. November 1990.
- Skinner, M.L.; Elder, G.H., Jr.; and Conger, R.D. Linking economic hardship to adolescent aggression. *J Youth Adoles* 21(3):259-276, 1992.
- Smart, R.G., and Jarvis, G.K. Do self-report studies of drug use really give dependable results? *Can J Crim* 23:83-92, 1981.
- Smith, G.T., and Goldman, M.S. Alcohol expectancy theory and the identification of high-risk adolescents. *J Res Adoles* 4(2):229-247, 1994.
- Sorenson, J.L., and Hargreaves, W. Methods of evaluating rural mental health programs. In: Keller, P.A., and Murray, J.D., eds. *Handbook of Rural Community Mental Health*. New York: Human Sciences Press, 1982. pp. 146-157.

- St. Louis, M.E.; Conway, G.A.; Hayman, C.R.; and Miller, C. Human immunodeficiency virus infection in disadvantaged adolescents: Finding from the U.S. Jobs Corps. *JAMA* 266(17):2387-2391, 1991.
- Steinberg, L. Adolescent transitions and alcohol and other drug use prevention. In: *Preventing Adolescent Drug Use: From Theory to Practice*. OSAP Prevention Monograph 8. DHHS Pub. No. (ADM) 91-1725. Rockville, MD: Office of Substance Abuse Prevention. 1991.
- Stevens, M.; Youells, F.; Whaley, R.; and Linsey, S. Prevalence and correlates of alcohol use in a survey of rural elementary school students: The New Hampshire study. *J Drug Educ* 21(4):333-347, 1991.
- Stivers, C. Grassroots efforts pursue alcohol policy reform: Refocusing upstream in New Mexico. *Am J Health Prom* 9(2):125-136, 1994.
- Strunin, L., and Hingson, R. Alcohol, drugs, and adolescent sexual behavior. *Int J Addict* 27:129-146, 1992.
- Substance Abuse and Mental Health Services Administration, Office of Applied Studies. *National Household Survey on Drug Abuse: Main Findings 1991*. DHHS Pub. No. (SMA) 93-1980. Rockville, MD: U.S. Department of Health and Human Services, 1993a.
- Substance Abuse and Mental Health Services Administration, Office of Applied Studies. *Preliminary Estimates from the 1992 National Household Survey on Drug Abuse: Selected Excerpts*. Advance Report No. 3. Rockville, MD: U.S. Department of Health and Human Services, 1993b.
- Substance Abuse and Mental Health Services Administration, Office of Applied Studies. *Preliminary Estimates from the 1993 National Household Survey on Drug Abuse*. Advance Report No. 7. Rockville, MD: U.S. Department of Health and Human Services, July 1994.
- Swaim, R.; Beauvais, F.; Edwards, R.W.; and Oetting, E.R. Adolescent drug use in three small rural communities in the Rocky Mountain region. *J Drug Educ* 16(1):57-73, 1986.
- Swaim, R.C.; Oetting, E.R.; Edwards, R.W.; and Beauvais, F. The links from emotional distress to adolescent drug use: A path model. *J Consult Clin Psychol* 57(2):227-231, 1989.
- Sweedler, B.M. Strategies to reduce youth drinking and driving. *Alcohol Health Res World* 14(1):76-80, 1990.
- Swisher, J.D. What works? In: *Prevention Research Findings: 1988*. OSAP Prevention Monograph 3. Rockville, MD: U.S. Department of Health and Human Services, 1990. pp. 14-23.
- Thombs, D.L.; Beck, K.H.; Mahoney, C.A.; Bromely, M.D.; and Bezon, K.M. Social context, sensation seeking, and teen-age alcohol abuse. *J Sch Health* 64(2):73-79, 1994.

- Thompson, K.M. Gender and adolescent drinking problems: The effects of occupational structure. *Soc Prob* 36(1):30-47, 1989.
- Thompson, M.L.; Daugherty, R.; and Carver, V. Alcohol education in schools: Toward a lifestyle risk-reduction approach. *J Sch Health* 54(2):79-83, 1984.
- Tobler, N.S. Drug prevention programs can work: Research findings. *J Addict Dis* 11(3):1-28, 1992.
- Tobler, N.S. Meta-analysis of 143 adolescent drug prevention programs: Quantitative outcome results of program participants compared to a control or comparison group. *J Drug Issues* 16:537-567, 1986.
- Tricker, R., and Davis, L.G. Implementing drug education in schools: An analysis of the costs and teacher perceptions. *J Sch Health* 58(5):181-185, 1988.
- Tuchfeld, B.S., and Marcus, S.H. Social models of prevention in alcoholism. In: Matarazzo, J.D.; Weiss, S.M.; Herd, J.A.; Miller, N.E.; and Weiss, S.M., eds. *Behavioral Health: A Handbook of Health Enhancement and Disease Prevention*. New York: John Wiley and Sons, 1984. pp. 1041-1046.
- U.S. Congress, Office of Technology Assessment. *Adolescent Health—Volume I: Summary and Policy Options*. Pub. No. OTA-H-468. Washington, DC: Supt. of Docs., U.S. Govt. Print. Off., 1991.
- U.S. Senate Select Committee on Indian Affairs. *Indian Juvenile Alcoholism and Eligibility for BIA Schools* (Senate Hearing 99-286). Washington, DC: Supt. of Docs., U.S. Govt. Print. Off., 1985.
- Wagenaar, A.C., and Perry, C.L. Community strategies for the reduction of youth drinking: Theory and application. *J Res Adoles* 4(2):319-345, 1994.
- Wagenaar, A.C.; Finnegan, J.R.; Wolfson, M.; Anstine, P.S.; Williams, C.L.; and Perry, C.L. Where and how adolescents obtain alcoholic beverages. *Public Health Rep* 108(4):459-464, 1993.
- Wallack, L., and Corbett, K. Alcohol, tobacco, and marijuana use among youth: An overview of epidemiological, program, and policy trends. *Health Educ Q* 14(2):223-249, 1987.
- Wallack, L.; Grube, J.W.; Madden, P.A.; and Breed, W. Portrayals of alcohol on prime-time television. *J Stud Alcohol* 51(5):428-437, 1990.
- Wargo, M.J.; Solomon, J.; Oppenheim, J.; Sharma, S.; and Rom, M. *Rural Drug Abuse: Prevalence, Relation to Crime, and Programs*. Washington, DC: U.S. General Accounting Office, 1990.
- Weisfeld, V.D., ed. *Rural Health Challenges in the 1990s: Strategies from the Hospital-Based Rural Health Care Program*. Princeton, NJ: Robert Wood Johnson Foundation, 1993.
- Welte, J.W., and Barnes, G.M. Alcohol use among adolescent minority groups. *J Stud Alcohol* 48(4):329-336, 1987.

- Werch, C.E.; Gorman, D.R.; Marty, P.J.; Forbess, J.; and Brown, B. Effects of the bogus-pipeline on enhancing validity of self-reported adolescent drug use measures. *J Sch Health* 57:232-236, 1987.
- Werner, E. Protective factors and individual resilience. In: Meisels, S., and Shonkoff, J., eds. *Handbook of Early Childhood Intervention*. New York: Cambridge University Press, 1990.
- White, H.R., and Labouvie, E.W. Towards the assessment of adolescent problem drinking. *J Stud Alcohol* 50:30-37, 1989.
- White, H.R.; Hansell, S.; and Brick, J. Alcohol use and aggression among youth. *Alcohol Health Res World* 17(2):144-150, 1993.
- Wickizer, T.M.; Von Korff, M.; Cheadle, A.; Maeser, J.; Wagner, E.H.; Pearson, D.; Beery, W.; and Psaty, B.M. Activating communities for health promotion: A process evaluation method. *Am J Public Health* 83(4):561-567, 1993.
- Wiesner, J. New Holstein student assistance program. *Stud Assist J* 1(1):23-26, 1988.
- Winfree, L.T., Jr. Peers, parents, and adolescent drug use in a rural community: A two-wave panel study. *J Youth Adolesc* 14(6):499-512, 1985.
- Wittman, F.D. Community perspectives on the prevention of alcohol problems. In: Mecca, A.M., ed. *Comprehensive Alcohol and Drug Abuse Prevention Strategies*. California Health Resource Foundation, 1984. pp. 13-21.
- Wolfson, M. The citizens' movement against drunken driving and the prevention of risky driving: A preliminary assessment. *Alcohol Drugs Driving* 5(1):73-84, 1989.
- Workman, M., and Beer, J. Aggression, alcohol dependency, and self-consciousness among high school students of divorced and nondivorced parents. *Psychol Rep* 71(1):279-286, 1992a.
- Workman, M., and Beer, J. Depression, suicide ideation, and aggression among high school students whose parents are divorced and use alcohol at home. *Psychol Rep* 70:503-511, 1992b.
- Wright, R., Jr., and Watts, T.D., eds. *Prevention of Black Alcoholism: Issues and Strategies*. Springfield, IL: Charles C Thomas, 1985.
- Yagamuchi, K., and Kandel, D.B. Patterns of drug use from adolescence to young adulthood: Sequences of progression. *Am J Public Health* 74(7):668-672, 1984.
- Young, A. Seroprevalence of human immunodeficiency virus among adolescents in a Mississippi sexually transmitted disease clinic: A rural epidemic. *Southern Med J* 85:460-463, 1992.

Youth Health Service, Inc. *Guidelines for Replication of a Comprehensive, Community-Based Program for the Prevention of Substance Abuse among High-Risk Rural Youth*. Rockville, MD: Center for Substance Abuse Prevention, 1994.

Zador, P.I. Alcohol-related relative risk of fatal driver injuries in relation to driver and age and sex. *J Stud Alcohol* 52(4):302-310, 1991.

Zucker, R.A., and Harford, T.C. National study of the demography of adolescent drinking practices in 1980. *J Stud Alcohol* 44(6):974-985, 1983.

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